

The
Communicator

November - December 2025

The Bi-monthly Journal of Surrey Amateur Radio Communications



PUBLICATION CONTACTS

THE COMMUNICATOR Editor John Schouten VE7TI
communicator@ve7sar.net

CONTRIBUTING EDITORS John Brodie VA7XB
Kevin McQuiggin VE7ZD/KN7Q

The Communicator is a free electronic periodical published by Surrey Amateur Radio Communications in Surrey, B.C., Canada. All rights are reserved.

Our article reprint policy is on [page 119](#)

Issues appear bi-monthly, on odd-numbered months, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote amateur radio activity.

Contributions of articles and photos are welcome.

During non-publication months we encourage you to visit the Digital Communicator at ve7sar.blogspot.ca, which includes recent news, past issues of The Communicator, our history, photos, videos and other information.

To subscribe, unsubscribe or change your address for e-mail delivery of this electronic journal, notify communicator@ve7sar.net

If you find The Communicator worthwhile, regular readers who are not SARC members are invited to contribute a [donation](#) towards our Field Day fund via [PayPal](#) or via eTransfer to payments@ve7sar.net

SARC maintains a website at www.ve7sar.net

QSK?

---...---

...from the Editor's Shack



Welcome to the November-December 2025 edition of the SARC Communicator, your go-to guide for all things amateur radio in our vibrant RF neighborhood. This edition is a journey across the history, innovation, and fascinating activities of amateur radio.

As we transition from crisp fall days to the festive glow of holidays ahead, this issue looks at the enduring legacy of Émile Baudot, the pioneer of digital communication, and revisits the vital role of radio during the catastrophic 1917 Halifax Explosion.

For satellite operators, discover how to seamlessly integrate SkyRoof with the Icom IC-9700 for LEO satellite operations, and check out our review of the past year in amateur satellites.

Technical articles dive into RTTY as a viable emergency digital mode and explores the fascinating use of radio telemetry in insect tracking. We also have several articles on a current 'hot' activity, homebrew vertical antennas for Parks on the Air (POTA).

Finally, catch up on the excitement of the ARDF World Championship and a glimpse into the future of Software Defined Radio. There are articles for all levels of amateur radio and you're sure to find something of interest.

Dive in for inspiration, connections, and the pulse of what makes our hobby of hobbies special. A special year-end thank you to our contributors and columnists. On behalf of SARC and SEPAR, we wish all of you a safe and happy holiday season. Stay engaged—our readership powers us forward!

Enjoy this final issue of 2025!

~ John VE7TI, Editor

Surrey Amateur Radio Communications

IN THIS ISSUE

The Rest of the Story: Émile Baudot's Enduring Legacy	4	Ham Radio Outside the box	70
Radio's Role in the 1917 Halifax Explosion	8	A good idea for suspending radials	72
NARA NVIS Test	12	A Portable Power Project	73
The Lighter Side of Amateur Radio	13	Zero Retries	76
Repair and Repurposing	14	Margaret Atwood on CW?	80
Radiofrequency and Telemetry in Insect Tracking	24	When your hobby revolves around electricity...	82
What's New at DLARC — October 2025	28	Back to Basics - Digital Modes	86
ARDF Canada World Championship 2025 in Lithuania	30	Study Aids	89
Integrating SkyRoof with the Icom IC-9700	32	No-ham Recipes: Meatloaf with sweet tomato-mustard sauce	91
RTTY; A viable emergency digital mode?	36	Profiles of SARC members: Sheldon Friesen VE7SRF	94
Pile-Up Control System - Take control of the pile-up!	40	SARC Member donates digital nautical archive	97
Satellite Tracking: Looking back on 2025, and ahead into 2026	42	SARC 50th Anniversary the transformative role of SARC	100
Homebrew Mobile Antennas	44	Peter Vogel VE7AFV: Profile in Tech, Science & Amateur Radio	102
The genius logic of the NATO phonetic alphabet	46	SARC General Meeting minutes	104
The North American QRP CW Club	48	The SEPAR Report	110
Simple QRP 9:1 Unun Construction	50	We're back on track!	115
The Dominator End-Fed Halfwave Antenna by KJ6ER	52	Is Amateur Radio an Old Hobby or a playground for explorers?	116
The POTA PERformer vertical antenna revisited	60	HAM LEFTOVERS...	118
FreqBuddy: A Modern Web-Based Radio Frequency Database	69	A look back... at The Communicator—December 2015	120

Do you have a photo or bit of Ham news to share? An Interesting story or link?

Something you are looking for?

eMail it to [communicator at ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.

This Month's Cover...

Dmitry had a busy summer practicing his CW skills and activating POTA locations. He has taken the KJ6ER POTA PERformer antenna from last issue and made some customizations that he shares with you in this issue.

"TV gives everyone an image, but radio gives birth to a million images in a million brains." — Peggy Noonan





The Rest of the Story...

The Pioneer of Digital Communication:

Émile Baudot's Enduring Legacy

The Pioneer of Digital Communication: In an era when the world was just beginning to shrink through the magic of instantaneous communication, one man's ingenuity laid the groundwork for the digital age. Émile Baudot, a French telegraph engineer born in the mid-19th century, might not be a household name like Thomas Edison or Alexander Graham Bell, but his inventions revolutionized how information traveled across vast distances. His creation of the Baudot code and a multiplexed printing telegraph system not only multiplied the efficiency of telegraph lines but also introduced principles of digital encoding that echo in today's computers, smartphones, and internet protocols. The unit of data transmission speed, the "baud," bears his name—a testament to his profound impact on telecommunications. As we navigate a hyper-connected world in 2025, where data flows at gigabits per second, it's worth pausing to explore the life and work of this unsung hero who helped make it all possible.

Jean-Maurice Émile Baudot
(1845–1903)

Surrey Amateur Radio Communications



Baudot's story begins in the rural heart of France, far from the bustling innovation hubs of Paris. Born on September 11, 1845, in the small village of Magneux in Haute-Marne, Jean-Maurice-Émile Baudot was the son of Pierre Émile Baudot, a modest farmer who later rose to become the mayor of their community. Growing up in a time when France was undergoing rapid industrialization under Napoleon III, young Émile's early life was steeped in the simplicity of agrarian existence. His formal education was scant, limited to the local primary school, where he learned the basics of reading, writing, and arithmetic. By his early teens, he was already toiling on his father's farm, handling chores that built his practical skills and resilience. This hands-on experience with machinery and problem-solving would later prove invaluable in his engineering pursuits.

Despite his humble beginnings, Baudot's curiosity about the world beyond the fields propelled him forward. In 1869, at the age of 24, he seized an opportunity to join the French Post & Telegraph Administration as an apprentice operator. This was a pivotal moment, as the telegraph was then the cutting-edge technology of the day, akin to the internet in our time. Baudot underwent rigorous training in Morse code and the operation of telegraph systems. He also completed a four-month course on the Hughes printing telegraph instrument, a device invented by David Edward Hughes that printed messages on paper tape. This exposure ignited his inventive spark, planting the seeds for his future breakthroughs.

The Franco-Prussian War of 1870-1871 interrupted Baudot's budding career. Like many young Frenchmen, he served his country during the conflict, which saw France's defeat and the fall of the Second Empire. Upon returning to civilian life in 1872, he resumed his duties in Paris, where the Telegraph Service recognized his potential and encouraged him to innovate. The post-war period was one of reconstruction, and the demand for efficient communication was skyrocketing. Telegraph lines were overloaded, with single wires carrying only one message at a time using Morse code, leading to bottlenecks in an increasingly interconnected Europe.

It was in this context that Baudot began tinkering with ideas to optimize telegraphy. By 1870, he had already conceived his famous telegraph code, a 5-bit binary system that represented letters, numbers, and symbols using combinations of on and off signals. This was groundbreaking because, unlike Morse code's variable-length dots and dashes, Baudot's code used fixed-length sequences of five units, making it more suitable for machine automation. Each "bit" was an equal interval of current or no current, allowing for precise synchronization. He patented this code in 1874, but it was just the beginning.

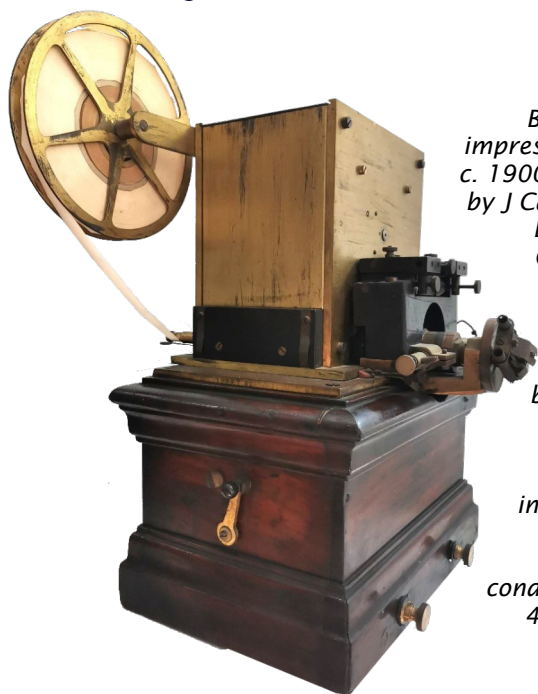
Baudot's true genius shone in his development of a multiplexed printing telegraph system, which allowed multiple messages to be sent simultaneously over a single wire. Drawing inspiration from the Hughes printer's mechanism (patented in 1855), a distributor invented by Bernard Meyer in 1871, and the five-unit code pioneered by physicists Carl Friedrich Gauss and Wilhelm Weber in the 1830s, Baudot synthesized these elements into a cohesive system. His apparatus featured a keyboard with five piano-like keys—two operated by the left hand and three by the right—designed for ergonomic efficiency and easy memorization of codes. Operators would press combinations to generate the 5-bit signals, maintaining a rhythm of about 30 words per minute.

At the heart of the system was time-division multiplexing (TDM), one of the earliest applications of this technique. Synchronized clockwork switches at both ends of the line divided the transmission time into slots, allowing up to five (and later more) messages to interleave without interference. The receiver used electromagnets to store incoming signals temporarily before printing them on paper tape. A "cadence signal" provided an audible click to keep operators in sync, ensuring the system's reliability. This not only quadrupled or quintupled the capacity of existing lines but also reduced costs significantly, as fewer wires were needed for high-volume traffic.



The French Post & Telegraph Administration adopted Baudot's multiplex system in 1875, marking its first practical deployment. The inaugural online test occurred on November 12, 1877, between Paris and Bordeaux, proving its viability over long distances. By the end of that year, it was operational on the 1,700-kilometer Paris-Rome line in duplex mode, handling bidirectional traffic. The system's international debut came at the 1878 Exposition Universelle in Paris, where it captivated audiences and earned Baudot a gold medal. This exposure propelled his invention onto the global stage, leading to widespread adoption.

Throughout the 1880s and 1890s, Baudot continued refining his technology. In 1887, he successfully tested it on the transatlantic cable, demonstrating its robustness over oceanic distances. By 1890 and 1894, he established communications using single wires for multiple channels, pushing the boundaries of efficiency. In 1897, he introduced an upgrade using punched tape, where messages were prepared offline on paper with five rows for the code and a sixth for mechanical transport. This innovation separated composition from transmission, boosting speed and accuracy. The Baudot code evolved into the standardized International Telegraph Alphabet Number One, influencing later codes like ASCII.



Baudot multiple-impression telegraph, c. 1900 Manufactured by J Carpentier Paris, brass and steel, Grunewald type electric motor mounted upside down. For the five-bit Baudot code. With constantly rotating print wheel and five internal relays to select printed symbols. Good condition, Measures 40x35x20 aprox

Adoption spread like wildfire: France led the way, followed by Italy in 1887, the Netherlands in 1895, Switzerland in 1896, Austria and Brazil in 1897, Britain between 1897 and 1898, Germany in 1900, Russia in 1904, the British West Indies in 1905, Spain in 1906, Belgium in 1909, Argentina in 1912, and Romania in 1913. Baudot's system became the backbone of international telegraphy, facilitating commerce, diplomacy, and news dissemination in an era of colonial expansion and global trade.

Yet, success did not come without hurdles. Baudot often funded his experiments out of pocket, facing indifference from the Telegraph Administration. In a poignant episode, he sold his 1878 gold medal in 1880 to finance further research, highlighting the personal sacrifices behind his achievements. His career advancements were steady but modest: promoted to Controller in 1880 and Inspector-Engineer in 1882.

On a personal front, Baudot's life was marked by tragedy and health struggles. He married Marie Josephine Adelaide Langrognet on January 15, 1890, but she passed away just three months later on April 9, 1890. Baudot himself suffered from physical ailments starting soon after entering the telegraph service, leading to frequent absences. These issues, possibly related to the stresses of his work or underlying conditions, persisted until his death on March 28, 1903, in Sceaux, near Paris, at the age of 57.

Despite these challenges, Baudot's contributions were richly honored during his lifetime. He received the Diploma of Honor at the 1881 International Electrical Exposition, a gold medal from the Société d'Encouragement pour l'Industrie Nationale in 1882, and the Ampere Medal from the same society in 1889.

Knighthoods followed: Chevalier of the Légion d'honneur in 1878 (promoted to Officier in 1898), Order of Leopold from Belgium in 1882, Order of Franz Joseph from Austria in 1884, Order of the Crown of Italy in 1891 and 1901, and Order of Saints Maurice and Lazarus from Italy in 1900. A street in Paris's 17th arrondissement once bore his name, though it was demolished in 1971 for the Boulevard Périphérique.

Baudot's legacy extends far beyond awards. His work bridged the analog world of Morse to the digital realm, influencing modern computing and data transmission. The Baudot code predated EBCDIC and ASCII, serving as an early character set for digital communication. Multiplexing principles he pioneered are fundamental to today's telecommunications, from telephone networks to broadband internet, where TDM and its variants like frequency-division multiplexing enable massive data throughput.

In 1926, the International Telegraph Communications Advisory Committee immortalized him by naming the unit of telegraph speed the "baud," measuring symbol rate per second. Though often confused with bits per second, the baud remains a key metric in signal processing.

Baudot's innovations also paved the way for teletypewriters and early computer interfaces, contributing to the evolution of information technology.

Reflecting on Baudot's life, one sees a narrative of perseverance amid adversity. From farm boy to telegraph pioneer, he embodied the spirit of the Industrial Revolution, turning theoretical ideas into practical tools that connected the world. In our digital age, where communication is instantaneous and ubiquitous, we owe a debt to this French engineer's vision. Émile Baudot didn't just invent a code; he encoded the future.

~

The Baudot code is a five-bit binary code, with each character represented by a fixed-length combination of five bits (on/off or mark/space). This allowed efficient, synchronized digital transmission and underpinned the first practical time-division multiplexed telegraph system. This translates to five signal pulses for each letter, with Marks (on) and Spaces (off) sent at set time intervals.

The original keyboards had five piano-type keys—two for the left hand, three for the right. It encodes letters, figures, punctuation, and control signals. Shift codes are used to toggle between "letters" and "figures" modes, thereby doubling the code's capacity.

Each operator's input is scanned in turn (using a distributor) and transmitted as sequential bits on a shared line. The receiving end decodes each five-bit group into the corresponding symbol. Reliable operation required the transmitter and receiver's distributors to remain in exact sync, prompted by audible cadence signals. Typical operator speed was about 30 words per minute. Circular device with brushes for channel multiplexing/scanning.

Character	Baudot (Binary)	"Mark"/"Space"	Decimal
A	00011	Space Space Mark Mark Space	3
B	11001	Mark Mark Space Space Mark	25
C	01110	Space Mark Mark Mark Space	14
D	01001	Space Mark Space Space Mark	9
E	00001	Space Space Space Space Mark	1
Space	00100	Space Space Mark Space Space	4

Later improvements used punched paper tape—five holes per row for each bit, with an extra row for tape transport.

The International Telegraph Alphabet No. 1 (ITA1) standardized the Baudot code before it later evolved into more complex codes like ITA2, and, much later, ASCII.

The "baud" rate, a measure of signal units per second, was named for Baudot and remains a core metric in digital communication.

The Baudot code combined simplicity, speed, and efficiency, foreshadowing binary encoding standards used in computing and networking today.

~



Trials and Errors #55

Radio's Role in the 1917 Halifax Explosion

by DAVE JENSEN W7DGJ



Dave Jensen, W7DGJ, was first licensed in 1966. Originally WN7VDY (and later WA7VDY), Dave operated on 40 and 80 meter CW with a shack that consisted primarily of Heathkit equipment. He has published articles in magazines dealing with science and engineering.

In August of 1914, the Canadian Government decided that radio amateurs would have to disassemble their equipment and remove any transmitting or receiving apparatus from their homes. This was due to the onset of WWI, as Canada went to war with Germany three years earlier than the USA. [Later, the government in the States took similar actions as well.] Everyone assumed -- perhaps rightly so - that in wartime there should be only one party responsible for the airwaves. The unfortunate result of this was that many communities lost a valuable asset... their emergency communication via radio, an "unwired" mode that can be so important when disaster strikes. It was left to telegraph stations to transmit across great distances and to call for help when needed.

That is, unless something terrible happens to the telegraph stations at the same time.

In December of 1917 that scenario came to pass in Halifax, Nova Scotia. An event took place there which taught the world how important it is to have radio communication up and running 24/7. It is simply impossible to know when and where disaster will strike.

Emergency communications will always be a key element for anyone who holds a mic or key in their hands.

Events Leading up to the World's Largest Explosion

On December 1st of 1917 the tramp steamer *Mont-Blanc* (registered out of Rouen, France) left New York City on its way to Halifax, Nova Scotia. "Tramp" steamers were steam freighters that didn't have a regular schedule -- they could be hired at any time by any party for any kind of transport. The *Mont-Blanc* was to join a convoy that would soon be headed to Britain, and her cargo was especially dangerous. Every single space on the ship contained barrels or crates



of explosives bound for the war effort. This included TNT, picric acid, and guncotton down below, as well as barrels everywhere on deck containing the highly volatile and easily ignited hydrocarbons benzene and toluene. She was literally a floating bomb.

The *Mont-Blanc* arrived too late in the evening on December 5th to enter the harbor as the submarine nets had been raised. Her captain, Aime Le Medec (see photo right) intended to put up for a few days in Halifax and meet his fellow travelers. While ships with dangerous cargo were generally not allowed into the harbor, those rules were for some reason relaxed on this day. On the morning of December 6th, the Halifax harbormaster sent a pilot onto the *Mont-Blanc* for the trip into the harbor. The first thing that pilot MacKay did upon learning of the *Mont-Blanc's* cargo was to request special protective ships to accompany them on either side as they entered the narrows.

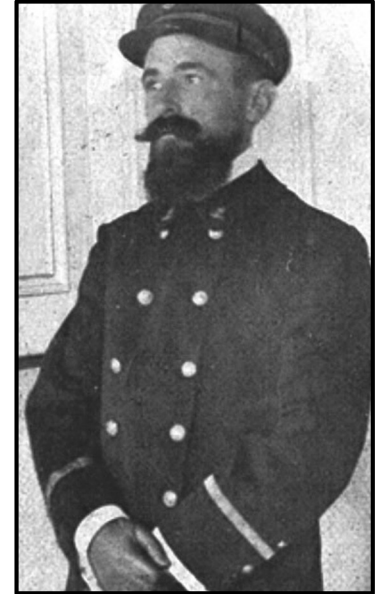
That protection never arrived.

As captain Le Medec and his pilot began to move the *Mont-Blanc* into the Halifax harbor, another ship, the *Imo*, took leave of her coal tender to get a quick start out of Halifax. The captain of the *Imo* was in a rush as he had grown increasingly frustrated at how long it had taken for the Canadians to fill his coal bunkers. Everyone who witnessed the *Imo's* departure that morning testified later that the Norwegian ship left harbor at an excessive speed.

The *Mont-Blanc* was more than two kilometers away when the pilot spotted the *Imo* running at a good clip and in what looked like a route to a direct collision. While two kilometers sounds like a distance at which a correction could be made, this caused great concern to the crew of the *Mont-Blanc*. The *Imo* was nearly empty and running high in the water, and with its speed and the fact that it would be hard to control, the situation looked murky even at the distance the two ships were separated.

Other ships nearby moved out of the way, with passengers and crew lining the decks to see what was going on as the two ships, *Mont-Blanc* and *Imo*, had been exchanging blasts on their foghorns. Knowledgeable watchers knew that the *Imo* had refused to change course and that the *Mont Blanc*

had requested to pass on the wrong side. Great numbers of people from the Richmond neighborhood came out of their homes to see what the commotion was all about in the harbor. Children were walking to school at this time and moved in closer to get to a better viewpoint. Workers at the Acadia Sugar Refinery, the "tallest building in Canada East of Montreal," came out on the tower's roof to view the *Mont-Blanc* changing course.



Mont-Blanc Captain
Aime Le Medec

Have you ever been walking down the sidewalk when a stranger appears ahead and you move aside, only to find that person has also moved, and then the same thing happens again and it's almost like you are destined to bump into each other? That's what it was like for these two ships. To the hundreds of onlookers, the *Imo* looked as if it might just finally sneak by after some course corrections by both vessels. When they met, the ships seemed to be running almost parallel. Most thought that Captain Le Medec's last-minute change of course had saved the day.

Errors Compounded - the Dangers of Controlling an Empty Ship

An empty steamer, with nothing in its hold to help steady the ship, is the single-most difficult type of ocean-going vessel to control. Captain Haakon From of the *Imo* had to manage this difficult scenario as best he could. Unfortunately, as the ship drew up to the *Mont-Blanc*, From decided that he would apply power to his propellers. Instead of gently veering away from the other ship, his rapid change brought the bow of the *Imo* directly into the *Mont-Blanc*, creating a gash of two-to-three meters above the water line.



On board the *Mont-Blanc*, crew ran around the decks trying to bring dozens of broken barrels of benzene and toluene upright again. These barrels began to pour a dangerous liquid through every crack and crevice on deck and into the hold, soaking the hundreds of crates of TNT and other explosives that were stored below.

All was quiet for a few minutes - that is, until the *Imo* reversed engines to pull her bow out of the other ship. Upon doing so, metal-on-metal scraping created sparks that ignited the dangerous fuels. Pitch black smoke began to rise from the *Mont-Blanc* and onlookers on all sides watched as Captain Le Medec ordered everyone into lifeboats and away from the scene as quickly as possible.

When the cargo exploded a few minutes later, it proved quite unfortunate for Captain From that the *Imo* did not do so as well.

A Blast that All Other Explosions Would Be Measured Against

In the film *Oppenheimer*, there's a scene in which the scientists developing the atomic bomb discuss the explosion at Halifax that day. Until Hiroshima, this was the blast upon which all explosives were measured for potential damage in an urban area. When the *Mont-Blanc* exploded, the core of that inferno inside the mushroom cloud contained temperatures exceeding 5,000 degrees Celsius. Instantly, there was no *Mont-Blanc* remaining... it disintegrated into tiny chunks of hot, melted steel covered in a black oily substance. It was this gigantic blast of shrapnel that killed so many onlookers that morning within a moment or two of the explosion. It literally rained pieces of the *Mont-Blanc* for many kilometers around Halifax.

Everything within 800 meters of the *Mont-Blanc* was flattened, including hundreds of homes, schools, and factories. The ship's huge, half-ton anchor was carried more than two miles. The Acadia sugar plant lay in a pile of rubble, its workmen buried within. Windows blew out of homes in cities dozens of miles away due to the gigantic shock wave; a huge, billowing cloud of debris and smoke was visible to ships as far as 100 miles out to sea. In the book "Explosion in

Halifax Harbor" by David Flemming, the author describes two young boys, Noble Driscoll and his brother Gordon, who were on their way to school when they stopped to watch the events unfold. The shock wave sent Noble flying over half a mile. He survived while Gordon's body was never found. Nearly 2000 people lost their lives that morning, with 6000 injured and 20,000 left without homes.

One minute before the blast, a lone telegraph operator managed to get a short message out about a fire in the harbor. Moments later, however, that station was wiped out along with everything else. It would be up to radio to let the world know that this tragedy had occurred. But with no amateurs on the air, how would this happen?

The HMCS Niobe

The Royal Canadian Navy wasn't formed until 1911, and in those early days had only a few ships spread between both West and East coasts.

The *HMS Niobe* was one of two cruisers purchased from Britain and had been intended to patrol the entrance to the St. Lawrence River. Earlier she had been a part of the Royal Navy's 4th Cruiser Squadron which patrolled the seas outside New York City. At the time of the Halifax Explosion, the *Niobe* had begun to wear out. Her funnels were found to be rapidly deteriorating, her boilers were worn and her bulkheads were in disrepair... hence, she was in harbor acting as a depot ship at the time of the explosion. Luckily for Halifax, there was a radio operator on board the *Niobe*.

Mr. George Harris was the Warrant Officer and Telegraphist on the *HMCS Niobe*. At the time of the outbreak of fire onboard the *Mont-Blanc*, a half-dozen of the *Niobe's* crew left on its launch to aid the burning ship. Unfortunately, they were on board when the *Mont-Blanc* disintegrated in the explosion. George, however, had stayed behind to man the radio. He was going down an outside ladder at the time his crew members died in the explosion - knocked off the ladder onto the deck, he immediately ran to the wireless cabin and found the equipment intact. His alert and call for help reached Camperdown Radio at Portuguese Cove at the approaches of

Halifax Harbor, and was also copied by an American ship and others in the Atlantic, all of which turned towards Halifax. George's call for help allowed radio to, once again, shine as a key element of emergency communication.

As an aside, after the war George Harris was in charge of all the radio stations until shortly after WWII, including considerable time when George Harris issued all amateur radio licenses as well.

Nature Adds its Fury to the Mix

The sensational headlines shown in the Boston Daily Globe show that nature was not kind to Halifax in the days following the tragedy. A gigantic snow storm hit the area with blizzards that made it very difficult to continue the rescue operations... this only added to the numbers of dead and homeless. Another consequence of the enormous explosion in the harbor was a 15 ft. Tsunami which rose up after the displacement of water in the harbor. That wave traveled many miles and completely devastated a community of Mi'kmaq indigenous people, one that had been at that location for many generations.

That tribe had always called the land on which Halifax was built "Kjiputuk, the Great Harbor." Before and after this awful event the Mi'kmaq considered the region to be sacred. It holds a significant place in the Mi'kmaq culture - they consider it to be "Amntu'kati," which means "a place of spirits." I'm sure that spirits of the Halifax explosion still haunt this beautifully reconstructed and important Canadian city.

Please join us in the discussion attached to this [QRZ article](#). Questions to consider in the discussion: Does radio still have a place in emergency communications? Are there any modern examples of radio's importance to emergency

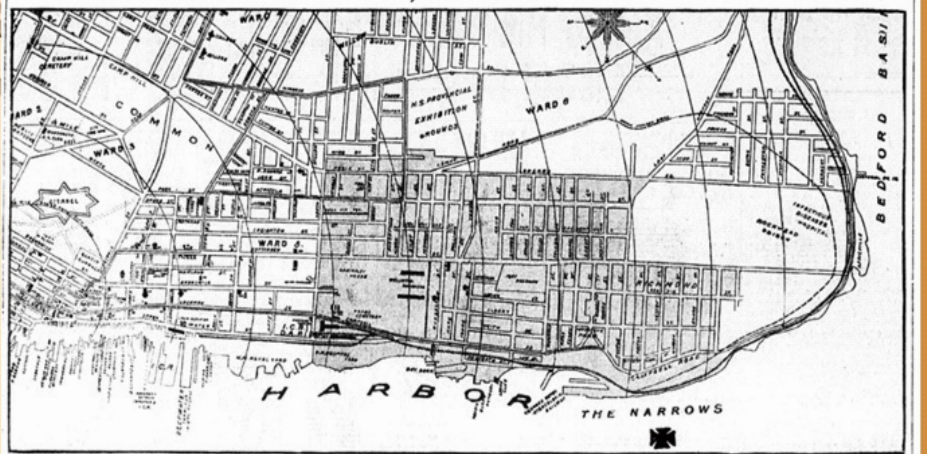
The Boston Daily Globe

BOSTON, SATURDAY MORNING, DECEMBER 8, 1917—FOURTEEN PAGES

BLIZZARD CUTS OFF HALIFAX 20,000 SURVIVORS DESTITUTE

**Trains Carrying Injured to Nearby Places For Treatment and Rushing Aid to Homeless Thousands Stalled in Deep Snow Drifts---
List of Dead May Reach 2800 With 3000 or More Hurt**

MAP SHOWING SECTION OF HALIFAX DEVASTATED BY EXPLOSION AND FIRE, INDICATED BY SHADED PORTION



communications that we can detail for readers of [QRZ.com](#)? For Canadians, please feel free to tell QRZ.com readers how the lessons of Halifax are taught in school, or point out any errors in our article.

Thanks and VY 73,

~ Dave W7DGJ

Reprinted from "Trials and Errors" courtesy of the author.
For more great stories please visit Dave's page at:

<https://www.qrz.com/trials-and-errors>

Page 12

News You Can't Lose

NARA NVIS Test

Near Vertical Incident Skywave Tests by the Nanaimo Amateur Radio Association



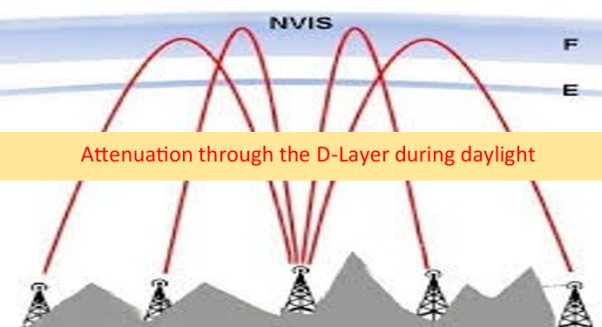
The [Nanaimo Amateur Radio Association](#) invites you and your club members to participate in some NVIS radio propagation tests on the 60m band.

Here is the essential information:

- Date - Sunday Dec 21 (shortest day)
- Time - 11:30 am to 2:30 pm
- Callsign - VE7NA
- Mode - USB
- Frequency - 5.346.5 MHz (dial freq.) (On channelized radios use 5.348 MHz)

NARA's NVIS tests on Dec. 21 allow us all to get together again on the 60m band, to exchange season's greetings and test the range that we can achieve on the 60m band in daylight when the D-layer prevents longer distance communication.

The scenario for these tests is to simulate voice communication (USB) from an Emergency Operations Centre (EOC) trying to communicate on the 60m band over several hundreds of Kilometers during daylight.



One of the reasons that the Amateur Radio Service gained the 60m band in 2002 was because these

frequencies were recognized as being very useful for emergency communications.

While the 60m band is often forgotten it can produce good ranges during daylight and longer distance communication at night when the D-layer is not present.

Note that the attenuation through the D-Layer during daylight is both as the signal goes upwards and downwards! Also because of the geometry, as distances between two stations widens the attenuation also increases.

Many amateur radio stations may not have 60m antennas but with some ingenuity amateurs should be able to load up one of their wire antennas to radiate a signal on the 60m band. VE7NA will act as net control station for these tests. In addition to VE7NA transmitting from the Nanaimo area, we also welcome listener reports/logs from other stations. Especially noting what stations were calling VE7NA but who were not heard by VE7NA.

VA7NA will put out voice calls on the above frequency during the test period every 10 minutes but do call in at any time. Please do consider participating in these propagation tests and please advise your friends. Any queries or reports should be sent to: nvis@ve7na.ca

Hoping to work you on 60m,
73, NARA

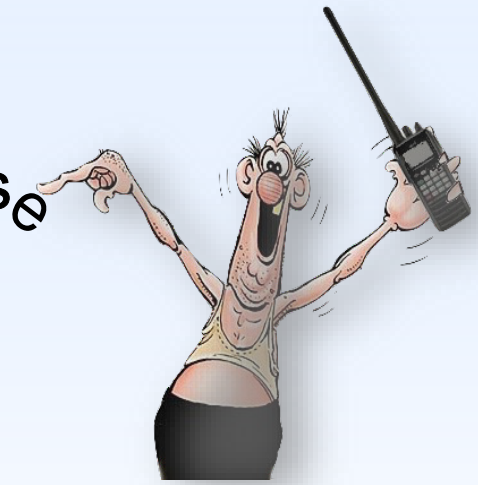


Surrey Amateur Radio Communications

Page13—News You Can Lose

The Lighter Side of Amateur Radio

Ham won't unbox rig



PFLUGERVILLE, TEXAS - Stephan Seymore's new Yaesu FT450D arrived yesterday but he says he "absolutely will not" take it out of its box.

Intrigued, Ham Hijinks caught up with Seymore as he was checking to ensure the transparent sticker covering the display on his Icom 756Pro was still in place.

"I reluctantly unboxed this one, but only because I know having the stickers on will bring some extra value when I sell it," he says, while pointing to the Icom.

When asked why he's intent on keeping the new arrival in its box, he recoiled as he told of a particularly traumatizing incident in 2007. One fateful day, his Kenwood mobile rig died after he plugged in an accessory while the power was still on. He says he "learned a lesson."

"I sent it off for repair and it came back good as new, but I decided to never turn it on again. I just didn't want to risk having an issue with it again. And you know what, I haven't had any problems with it since," he says.

For now, his new radio is on a shelf next to a TI-81 calculator circa 1991 - still in its plastic clamshell retail packaging.

HamHijinks.com

By K5KVN, on the scene



Willard Burton's Christmas tree burst into flames in 1982, when his string of lights conducted most of the 1,000 watts coming from his attic dipole.

In 2004, much to his amusement, Bill Leverette discovered that sending CQ in Morse code caused his neighbor's Christmas lights to blink in rhythm with "Hark! The Herald Angels Sing!"



Radio Ramblings

Repair and Repurpose

by KEVIN McQUIGGIN VE7ZD / KN7Q

Kevin Ahrens
www.kevinahrens.com



Kevin VE7ZD/KN7Q
is active in EME,
meteor scatter and
much more. He lives
on Vancouver Island.

It's the last Communicator of 2025, so it's in order for me to wish all of you a happy and healthy holiday season. All the best for Christmas, Hanukkah, or even "Festivus" [1]. 2025 went by very quickly here at VE7ZD with many interesting and fun radio-related activities. I hope that you had a good "radio year" as well.

The focus for this column will be on an unusual failure of my primary 1296 MHz EME (Earth-Moon-Earth, or "moon bounce") antenna and a novel idea for its repair, and a fantastic example of how a cheap camping stove has been repurposed as a high performance microwave antenna suitable for both EME and terrestrial amateur radio communication. This project represents a first-class example of amateur innovation and the unique creativity of the amateur radio service.

I will also provide a summary of other recent activities in the VE7ZD shack.

EME Antenna Woes

As you may recall from my earlier columns on EME, I am using a fabric dish for my antenna on 1296 MHz [2]. See Figure 1. The antenna is 2.4 metres in diameter and is collapsible. Like a patio umbrella, the it can be removed from its mount, folded up and placed in a handy carrying bag. Stressed ribs at the back of the antenna fabric create a parabolic shape when the antenna is deployed, and the fabric is impregnated with silver fibres so that it forms a reflective surface.



The antenna works very well, and I have made over 300 EME QSOs using it. These folding dishes are very popular both with new EME-ers and with experienced operators who are seeking to “go portable” for EME DXpeditions.



Figure 1 – VE7ZD 2.4m Fabric Dish

My experience with this dish has been tempered by a significant loss of performance for the system over the past couple of years. This summer, my EME station became virtually unusable, and I recognized that I had a serious problem. RX performance was terrible: reflected signals off of the moon were much weaker than I had ever experienced. I could only decode the most powerful stations, and their signal levels were, conservatively, about one quarter of the strength at which I had previously heard them. I needed to find out why.

My first thought was that perhaps my cabling, connectors, relays, or the EME system’s low noise amplifier (LNA: a preamplifier used at the antenna to amplify very weak signals) might have failed. Minimizing RX system losses is critical in EME. I pulled all the RX equipment off of the antenna and ran a full set of tests on it in the shack. This took a few days as I checked and re-checked each component. I replaced a couple of SMA connectors that were showing slightly higher loss than last year. There were, however, no clear signs of failure, so everything checked out. My RX chain should have been working just fine.

The only untested component remaining was the antenna - the 2.4 metre folding dish. I took a critical look at the antenna. The dish surface

was symmetrical and in good shape mechanically, and other than a lot of discoloration of the fabric, the antenna looked to be in fine shape. I made an inquiry with the manufacturer of the dish, Paul W2HRO [9], and sent him the results of my testing as well as some photos of the dish.

The discoloration of the dish fabric proved to be the “smoking gun”.

Paul was very helpful, and his most notable comment was that the discoloration of the dish’s fabric was unusual, and that (out of more than one hundred dishes sold) he had only seen this problem one other time. Figure 2m shows my dish when it was new (left), and how it looked this summer (right). You can see the discoloration of the fabric on the right-hand side of Figure 2 (red ellipses). Note the marked difference in the colour of the fabric, compared to how the fabric looked when it was new.



Figure 2 – Dish as New in 2021 (left) and in Summer 2025 (right)

I noticed on the EME mailing lists that another operator, Aleksandr Maksimov EA8DBM, owned the same antenna. He was experiencing a similar loss of RX sensitivity on his system and detailed his observations on his blog (<https://ea8dbm.substack.com/>). Like me, Aleksandr’s testing of his cabling, connectors and LNA showed the RX system behind the dish to be in good working order. He had concluded that the problem was with his folding dish.

Aleksandr tested the conductivity of his dish’s surface and determined that it showed high

resistance. This was not good: to be effective as an antenna the surface of a parabolic dish should be a reflector, but high surface resistance indicates that the dish's surface will absorb, rather than reflect, most of the RF energy that it sees. A perfect dish should show very low resistance, on the order of less than one ohm, between any two points on its surface.

With this in mind, I conducted some tests on the surface resistance of my dish. I used an



Figure 3 - Dish Surface Resistance of 226 Ohms

ohmmeter with a couple of alligator clip leads to measure resistance between several points on the dish surface. The results were alarming: I measured several hundred (and up to several thousand) ohms between points on the dish surface. See a photo of one of my measurements (226 ohms) in Figure 3.

Cross Check

I was fortunate in that my good friend Dennis AC7FT in Portland, OR owns the same model of folding dish that I do. I asked Dennis to make some similar resistance measurements on his antenna. His testing showed less than 1 ohm resistance between any two points on his dish.

There was clearly something seriously wrong with my antenna. While I had found the reason for my poor RX performance, I was very concerned and uncertain of how (or even if) I could fix the antenna.

On the positive side, I had definitely found the cause of my station's poor performance.

It confirmed my measurements in the shack which showed that the cabling, relays, connectors and LNA were up to specifications and fully functional.

Now I had to figure out how to fix the antenna.

Confirmation

I consulted W2HRO and we talked about the results of my testing. Hearing of my resistance test results, Paul quickly diagnosed the problem - "... it appears your fabric has become non-conductive". He had only heard of this problem in a couple of other cases.

In the first case, a DXpedition operator's dish had suffered damage after being left deployed for several days in the blazing sun that's typical of our planet's equatorial regions. The dish lost reflectivity when the embedded silver fibres degraded due to the intense heat of the sun.

The other case was the one I referenced above. Alexandr EA8DBM's antenna had suffered damage when the salt air in the Canary Islands had oxidized the silver fibres in his dish. In effect, the fibres tarnished and became resistive rather than conductive. The surface resistance of the fabric increased, and the dish ceased to be reflective.

This was my antenna's problem too, but for a different reason - one that Paul had never anticipated.



Figure 4 - Wildfire Smoke in BC, Summer 2023/2024

My dish had been deployed during the summer months of 2023 and 2024, during a period of intense wildfires in the Province. We can all recall (see Figure 4) the poor air quality caused by minute smoke particles carried aloft from dozens of wildfires that were burning in the Province. Breathing was uncomfortable for all of us, and many people were hospitalized for respiratory difficulties



This was the cause of the loss of performance of my dish: microscopic smoke particles in the air came into contact with the dish fabric. Hydrogen sulfide or sulfur particles in the smoke reacted chemically with the silver fibres in the fabric to convert silver to silver sulfide [4].

While silver is an excellent conductor, silver sulfide is an insulator. The dish surface became resistive rather than conductive: almost all of my antenna's reflectivity was lost.

You can clearly see the effect of the smoke on the dish's surface in Figure 2. The fabric's colour changed from a light brown, almost pinkish colour to the mottled dark brown shown on the righthand side of the photo. In the simplest terms, the dish surface tarnished, just like silverware left in the dining room for a long period of time.

Treating the dish surface with a tarnish removal chemical was not an option as this would likely destroy the dish's foundational fabric as well. I did not want to risk this.

W2HRO and I agreed on the cause of the problem. Paul advised that I could ship the dish to him for fabric replacement. Packaging and shipping would be expensive, and made even more difficult by the constantly changing import rules and tariffs in place between Canada and the USA. I might ship the dish and not be able to re-import it to Canada.

Ultimately, I decided against replacing the dish's fabric because of complexity and cost, but also because of the fact that large wildfires now occur every summer, and the loss of reflectivity due to wildfire smoke could easily happen again. I wanted to find a longer term solution.

What Could Be Done?

All was not lost. Aleksandr EA8DBM was able to restore the antenna's functionality by covering its surface with aluminum foil. This restored reflectivity (and low resistance on the dish's surface), and he found that the dish performed as well as it did when it was new.

The antenna didn't look great (see the left side of Figure 5), and it was hard to get the foil to stay down in any wind, but the approach worked, so Aleksandr took another step and bought a few dozen rolls of aluminum heating duct sealer tape and covered the dish fabric with it. See the right side of Figure 5. His EME antenna's performance was restored, and the dish remains foldable for his portable operations.



Figure 5 - EA8DBM's Repaired Dish in Two Stages

I ran a small experiment using aluminum foil purchased from the local Dollar Store. See Figure 6. I was only able to cover about a quarter of the dish's surface with foil. It was a windy day and the foil just wouldn't stay on the dish or lie flat.

Several strips blew off of the dish onto the lawn, so I abandoned further surface coverage and decided to run the test with just the bottom of the dish "foiled". I tucked the foil under the dish's ribs to hold it down for the testing.



Figure 6 - Aluminum Foil Test at VE7ZD

It was time to point the dish at the moon and see if I could hear any signals. To my surprise, even this small amount of foil worked pretty well and I was able to make about three contacts via EME. RX signal strength was way up from what it was when I used the dish *sans* foil. It was clear that high surface resistance had been my problem.

With this experiment proving the viability of “taping” the dish, I used a spare roll of aluminum heating duct tape to apply some strips of tape onto a handy rag so that I could measure its resistance on the test bench. I wanted to be cautious before taking the big step of taping up the entire dish.

I applied four strips of aluminum tape onto the rag with a slight overlap between the strips. See Figure 7. Next was to test the surface resistance.

Resistance was low between all points on each single strip of this tape, but resistance between strips of the tape was very high. Would this affect the performance of the “taped” dish?



Figure 7 - Test of Aluminum Tape's Resistance

The lack of conductivity between the strips was likely due to the tape adhesive not being conductive. The strips were physically connected, but not electrically connected. I used a bit of copper tape to join the strips electrically, and this reduced all point-to-point resistances on the rag to a couple of ohms at most.

I was not sure whether use of overlapped individual strips would provide good reflective performance, so I again consulted my friend Dennis AC7FT, who is an RF Design Engineer.

Dennis said that a reflecting surface made up of several independent tape strips would likely work as a reflector (as EA8DBM had determined in practise), but that better performance could likely be achieved if the entire dish surface was a single conductor (i.e. if there was low

resistance across all of the dish's surface). For this, aluminum tape was not the best choice.

I went online looking for fully conductive tape, and discovered that copper tape with a conductive adhesive was specifically designed for this purpose.

This copper tape is widely used in the music industry in the design of electric guitars and other equipment where EM signals need to be isolated from one another. The tape is also used in the construction of Faraday cages and EM-safe facilities where electromagnetic energy needs to be kept in (or kept out) of panels or rooms. It's more expensive than aluminum tape, but cost was not the primary factor.

Copper tape would provide a uniform low-resistance surface for all points on the dish, and this would make a better reflector for EME. I ordered about a dozen rolls of 2" conductive copper tape from amazon.ca [5].

An experiment with several strips of copper tape with conductive adhesive on the other side of the handy rag (see Figure 8) proved to create a surface that has low resistance all across the surface. Copper tape will provide the best performance.

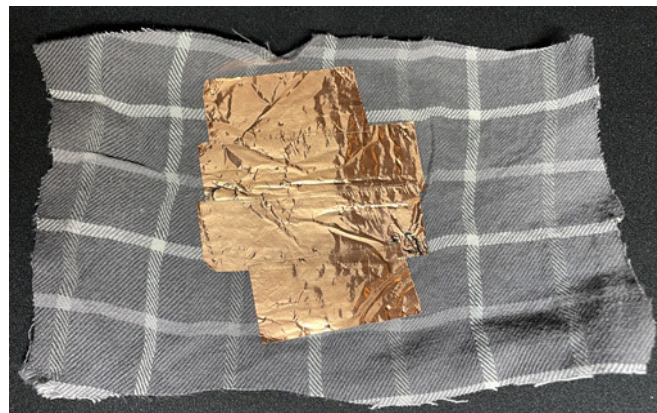


Figure 8 - Copper Tape Test

Next steps will be to apply the tape to my dish and see how it works. This will be a winter project. I hope to get the fabric dish all “taped up” over the holiday season. I'll run some tests, and then get the antenna back on the air in the spring after our long BC winter rains subside in



February or March. I'll provide a report on this project in a future column.

EA8DBM is able to collapse his taped dish and get it into its carrying bag with little trouble, so I do not think that I will lose the portability of the dish. Copper tape has about the same weight and pliability as aluminum tape, so folding the dish and getting it back into its bag should be possible. I will let readers know!

Repurposing

Repurposing has been part of amateur radio for over a century. Here's a great example of how a portable camping stove can be converted into a very effective EME antenna.

Credit for this idea lies with the well-known amateur Bob Atkins, KA1GT. Bob lives in Maine and is an avid experimenter, and a ham known for looking at old problems in new ways. Bob maintains a very interesting set of amateur radio related web pages at <https://www.bobatkins.com/radio/index.html>. His focus is on VHF, UHF and microwave operations, but there is interesting information there for every amateur, no matter what his or her interest.

Bob has been active on EME for years, and has mentored many new EME operators (including myself) who are new or even "relatively new" to the mode. A few months ago he was browsing the 'net and came across an advertisement for a parabolic "solar cooker" designed to be used on camping trips. There's a picture of this cooker on the left side of Figure 9.

The idea of the cooker is that the camper adjusts its elevation and points it at the sun so that the parabolic surface reflects the sun's rays to the focal point of the dish. The intense concentration of light is used to heat water or cook food in a pan at the focal point. You can see the pot or pan holder at the focus of the cooker in Figure 9.

As Bob mentions in his quite detailed blog post on this subject (see https://www.bobatkins.com/radio/150cm_EME_dish.html), the cooker looked like a good approximation to a parabolic antenna. It is 1.5 metres in diameter.



Figure 9 – A "Solar Cooker" and KB9Q's EME Adaptation

At a price of US\$52, he decided to order one and see how it would work as an EME antenna.

I will not repeat all the details of Bob's project as he does a great job of that on his web site, but will summarize it by saying that the "solar cooker" works extremely well as a high quality parabolic antenna at 1296 MHz, and in fact can be used successfully up to the 10 GHz band for either EME or for terrestrial communications! The dish's surface accuracy is quite good and gain for 10 GHz signals should be on the order of 41 dB [7].

The reflective tape on the solar cooker can easily be removed, and ops (including myself) who have purchased a "cooker" for EME experimentation are now figuring out how best to mount the dish (er, cooker) on their rotators in order to track the moon. Gene KB7Q is an early adopter of the "cooker" dish. A photo of his solar cooker deployment is shown on the right side of Figure 9 [8].

There are a few photos of my new cooker/dish in Figure 10. I have not removed the reflective tape from my dish yet, and I need to do further assembly on my mount. Given the current uncertainty re buying and importing the dish from the USA, I purchased mine at the Walmart store here in Courtenay.

I'm working on this project over the winter as well, and hope to be able to compare the 1.5 metre "cooker" dish with my 2.4 metre taped-up folding dish in the spring. The word so far from a dozen or so experienced EME-ers is that the "cooker" dish outperforms the 2.4 metre fabric



Figure 10 – Solar Cooker Dish at VE7ZD

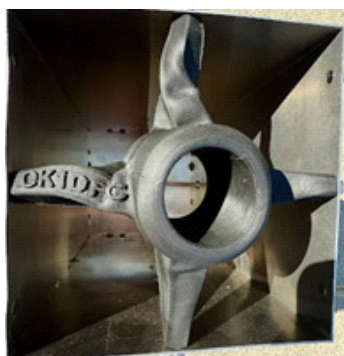


Figure 11 – Melted Feed Support!

dish because of its solid form factor and more accurate parabolic surface!

Safety warning from KB7Q: be sure to remove the reflective tape on the dish before using it with an EME feed! Should a “cooker” with reflective tape be inadvertently pointed towards the sun, the feed will melt very quickly! See Figure 11.

Parks on the Air (POTA)

POTA takes amateur radio portable operation to the field and encourages amateurs to operate from national, provincial, state, regional and local parks. Operators submit their logs to an international database maintained by the POTA organization and become eligible for awards, all at no cost. See <https://parksontheair.com/> for the details.

The activity grew out of a one-year operating event sponsored by the ARRL in 2016. The event was so popular that an ongoing program was “spun off” to a new non-profit organization (not associated with the ARRL), which runs the POTA program.

Conceptually, POTA is similar to Field Day (FD) in that it centres on amateur radio operation under portable and non-commercial power conditions from parks. However, POTA is strictly informal and other than the basic requirement of operating from a park, there are no, timelines, mode, or exchange requirements. The goal is simple: for ops to “get back to nature” and operate from scenic or interesting locations. You operate POTA simply by setting your gear up in a recognized park (one of the thousands in the POTA parks database) and calling “CQ POTA”, logging your QSOs and submitting them to the POTA database. This is called “activating” a park. See <https://pota.app> for details on this.

A tacit benefit of POTA activations, of course, is that amateurs use their equipment under portable conditions using emergency power. As a result, in the event of a real emergency or disaster, more operators will have gear that has been deployed recently and is in working order.

I have an under-utilized HF QRP rig and thought that POTA would be a fun activity to get involved in. I was fortunate to be able to engage the skillful assistance of John MacFarlane VA7PX of Qualicum Beach. John is a former SARC member, and a fellow member of the SARC “Island Contingent”. He and Derek Hutchinson VE7VPG (another SARC member now living in Comox) go out on POTA “activations” fairly often, and they invited me along.

With John’s tutelage I was able to get out on four POTA activations and get my feet wet. I got my gear together (my Elecraft KX3, a LiFePo battery and a “Packtenna” longwire antenna) and was able to use it with John on a couple of POTAs on Vancouver Island.

The training stuck. Just last week, VE7LPM and I were in Revelstoke on a driving holiday, and I was able to “activate” Revelstoke National Park. I ran 6 watts into a poorly deployed antenna but was able to make 15 QSOs in under an hour. Best DX was about 3500 km.

If you haven’t tried POTA and would enjoy visiting some of the local or regional parks for low-key and relaxing amateur radio activity with

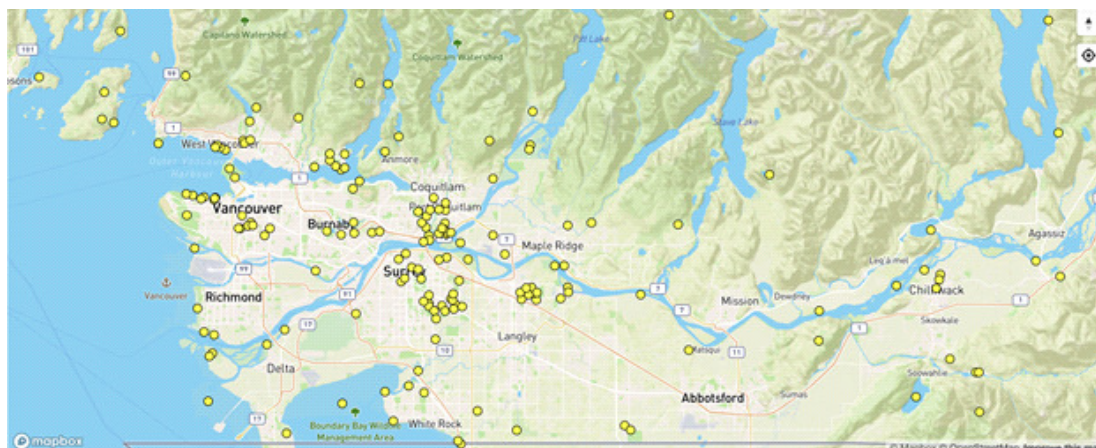


Figure 12 – POTA Parks in the Lower Mainland, October 2025 [10]

almost no operating constraints, timelines or schedules, then give it a try. There are more than one hundred POTA-recognized parks in the Lower Mainland. See Figure 12.

Like Field Day (FD), POTA is an opportunity to operate under portable conditions and hone your operating skills, but POTA lacks most of the constraints that FD has: there are no schedules, time limits, required exchanges, or mode restrictions.

For new hams, you can even operate POTA using your VHF/UHF handheld. Visit <https://parksontheair.com> to find out more.

Passive Radar Update

Lastly, I'll give a short update on my passive radar project. I wrote about the project in this column earlier this year (see [The Communicator/Radio Ramblings, January 2025](#) for the initial article [11]). The goal of the system is to use FM broadcast band radio signals as a "passive illuminator" and detect echoes of the FM broadcasts from aircraft in flight.

Work on the system is continuing, and I am currently working to improve target detection of aircraft. A better antenna (a homebrew 97.3

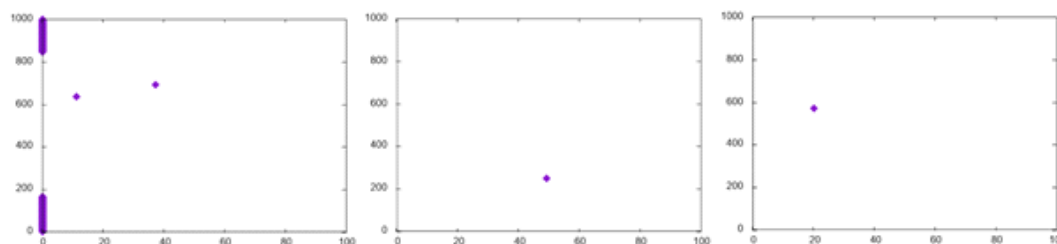
MHz 5-element Yagi) has helped, but the majority of improvements have come from tweaking the DSP software that removes clutter from static objects and uses fast Fourier transforms (FFTs) to detect moving targets. I am using a Nuand "bladeRF" SDR as the system receiver.

Plotting of targets is key to this system. DSP and FFT code can locate targets, but producing an easy-to-understand chart or map is where the "rubber hits the road" for a radar system. See Figure 13 for some detected targets. Range is on the bottom axis; velocity on the vertical axis.

My plotting is ho-hum, and one of the issues is that the plotting portion of the system is very slow. I want to be able to identify and plot targets in real time.

It's a learning project, so I view these issues as opportunities rather than obstacles. I did some research of advanced plotting programs and am now focusing on a package called "matplotlib" that is very popular in technical circles. Matplotlib runs under the popular open source language called Python and has excellent capabilities (see <https://matplotlib.org>).

Figure 13 – Four Aircraft Targets



I'm in the process of revising the plotting portion of the package to replace the existing graphing package gnuplot (see <https://gnuplot.org>) with matplotlib.

A second issue with the use of FM broadcast stations as passive radar illuminators is that the broadcast signal characteristics (the shape of the signal envelope) can vary greatly over time. Radar works best with broadband, noise-like signals as illuminators. In FM broadcasts, some types of music have good broadband envelope characteristics, but voice broadcasts (newscasts, regular advertisements, et cetera) do not.

A typical FM broadcast signal is about 200 KHz in bandwidth and it's waveform varies constantly in step with the signal's audio content. As viewed on a spectrum analyzer, this looks like a narrow peak centred in 200 KHz bandwidth, as on the left side of Figure 14. These signals were captured in my shack using a spectrum analyzer.

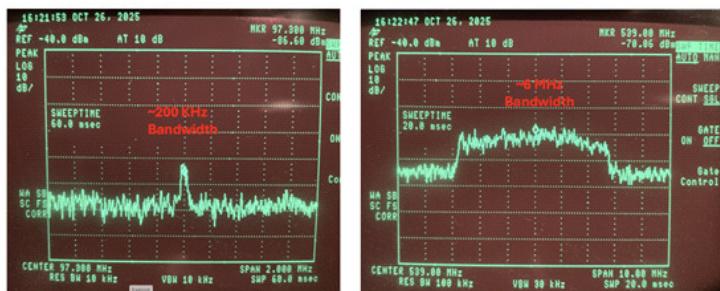


Figure 14 - Typical FM broadcast Signal (left), and ATSC TV Signal (right)

A narrowband, highly variable waveform is not optimal as a radar illuminator. Better illuminator waveforms have greater bandwidth and a constant noise-like envelope shape. Signals such as those that are generated by spread spectrum transmitters (like WiFi routers, cellular telephone sites or digital TV broadcasts) are inherently noise-like and are much better illuminators.

See the right side of Figure 14 for the signal envelope of a typical ATSC digital TV broadcast

signal [6]. Note the flat-top characteristics of the signal, and the fact that it looks like noise on a spectrum analyzer. Note also the signal's bandwidth: it is about 6 MHz wide, versus 200 KHz for the FM broadcast waveform.

The ATSC signal displays excellent noise-like qualities, and it is thirty times broader than the typical FM broadcast signal. This means that the signal will be much more effective as a passive radar illuminator.

I believe that much better performance can be achieved in my passive radar system by changing my illuminator to a local ATSC broadcast signal. Consistent target illumination will generate better radar target returns.

I checked an online broadcast transmitter database (see <https://tvfool.com>) and a search revealed that there are four TV transmitters in my area. One is analog and three are digital. See Figure 15.

Digital TV Channel 25 at 536-542 MHz is the best illuminator for my system. It is only about 19 km away and has a relatively high power of 4.45 kilowatts.

I have visited the excellent K7MEM Yagi design site at https://www.k7mem.com/Ant_Yagi_VHF_Quick.html and have a plan for a 539 MHz Yagi. I'll build this with a wooden boom and some spare aluminum tubing or even welding rod. I'll need to change my SDR code to operate at 539 MHz and to use a wider bandwidth, but as this is an SDR, design changes like this are straightforward. No hardware changes will be required, other than the new Yagi, which I would estimate can be built for about \$20.

I'll build this Yagi in parallel with the work on conversion from gnuplot to matplotlib. Look for an update early in the new year. As my system moves towards operational status, I will make the code available for others to run at their own QTH.

Figure 15 - TV Transmitters Near Courtenay, BC

Predicted Channel Availability (Current)										
Analog						Digital				
Callsign	Chan	Network	Dist (mi)	Path	NM (dB)	Callsign	Chan	Network	Dist (mi)	NM (dB)
CH4373	4		28.6	2Edge	-5.9	CHAN-DT-4	25 (25.1)		12.4	LOS 42.3
						CHAN-DT-6	23 (23.1)		54.7	2Edge -14.2
						KVOS-DT	35 (12.1)	Ind	119.6	Tropo -18.9



Conclusion

That's it for this issue. It is great to keep busy with interesting projects, and I hope that reading about my projects will spur readers to embark upon a new project of their own. Build that antenna, learn that new skill, or decide to try that new mode that interests you!

Don't underestimate your abilities or dismiss your life experience - if you need new skills, you can learn them. Don't let concerns about needing new skills keep you from trying.

References

- [1] "Festivus for the rest of us". From Wikipedia, "Festivus is a secular holiday celebrated on December 23 as an alternative to the perceived pressures and commercialism of the Christmas season." <https://en.wikipedia.org/wiki/Festivus>
- [2] Available from Paul Andrews, W2HRO at <https://sub-lunar.com/>. An innovative design, great quality and excellent support from Paul on all aspects of the antennas design, deployment and configuration.
- [3] Photo from EA8DBM's blog at <https://ea8dbm.substack.com/p/oh0ea8dbm-ylea8dbm-13-and-23-cm-eme>.
- [4] From DuckDuckGo's search assistant: "The reaction between sulfur and silver forms silver sulfide (Ag₂S), which appears as a dark tarnish on silver objects. This occurs when silver reacts with sulfur-containing substances, such as hydrogen sulfide in the air, leading to the formation of a black coating that dulls the silver's shine." See <https://duckduckgo.com>
- [5] "Copper Foil Tape with Conductive Adhesive", see https://www.amazon.ca/dp/B07N33FPF8?ref=ppx_yo2ov_dt_b_fed_asin_title&th=1
- [6] See Wikipedia's informative articles on digital television standards. https://en.wikipedia.org/wiki/ATSC_standards.
- [7] See <https://www.everythingrf.com/rf-calculators/parabolic-reflector-antenna-gain>.
- [8] KB7Q is an avid EME rover who has operated in just about every state in the USA. See his blog at <https://kb7qgrid.blogspot.com/>.
- [9] Visit <https://sub-lunar.com> to review Paul's leading edge EME products.
- [10] There is a movable/zoomable map that shows registered POTA parks at <https://pota.app/#/map>.
- [11] Lead article is at https://archive.org/details/SARC_Communicator_2025-03.

Feedback on Radio Ramblings is always welcome and may be directed to the Editor, or directly to me at mcquiggi@sfu.ca. Thanks for reading!

73,

~ Kevin VE7ZD / KN7Q

Comprehensive Index to Communicator Articles

Thanks to Blake VA7BWG and Reg VA7ZEB, a database index of Communicator articles back to 2007 is available at [Surrey Radio - Search the Archive](#).



And now for something completely different...

Radiofrequency and Telemetry in Insect Tracking:

Advances and Perspectives



by ERIKA ISABEL NATARAJAN VA7ISI/HJ1ISI



Erika Isabel Natarajan

VA7ISI/HJ1ISI is a Canadian–Colombian biologist with a deep passion for insects and biodiversity. She has worked in entomology and enjoys sharing her knowledge of nature through both research and community projects. Erika is also an active amateur radio operator in both Canada and Colombia, finding connection and collaboration through the airwaves. Her work bridges cultures, countries, and disciplines, always guided by a love for science and the natural world. She is fascinated by the small, tiny creatures we call insects, whose delicate lives hold immense importance for our world.

Radiotelemetry is the remote transmission of information through electromagnetic waves, generally radio waves, from a transmitter attached to an animal to a receiver operated by the researcher. Applied to wildlife, this technique—also known as radio tracking or radio tagging—has profoundly transformed ecological research by enabling questions about movement, habitat use, behavior, survival, or dispersal that would be impossible to answer through direct observation alone.

Radiotelemetry in wildlife is somewhat analogous to the well-known *fox hunting* practice in amateur radio: in both cases, directional receivers such as Yagi antennas are used to locate the source of a signal in the VHF spectrum. However, tracking free-living animals presents additional challenges. Unlike a fixed hidden transmitter, a living being equipped with a radio transmitter is capable of moving quickly, hiding behind vegetation, or altering its behavior depending on weather and resource availability. Therefore, beyond skill in

radiolocation techniques, successful tracking requires detailed biological knowledge of the species' ecology, activity schedules, flight patterns, and occupied microhabitats. This combination makes wildlife telemetry a genuinely interdisciplinary field, where radio expertise and biology complement each other to achieve reliable results.

Three main modalities of telemetry are recognized: **ground-based telemetry**, using portable receivers operating in the very high frequency (VHF, 150-151 MHz) band with directional antennas such as Yagis; **satellite telemetry (PTT)**, which employs ultra high frequency (UHF) signals to transmit data to geostationary satellites and enable large-scale tracking; and **GPS telemetry**, where transmitters calculate the animal's position via satellite triangulation, storing data in onboard memory or transmitting them in real time to a modem.

At present, radiotelemetry has become a fundamental tool in conservation biology and ecology. Its

use is widespread in birds, mammals, and reptiles, providing crucial information on activity areas, dispersal, and behavior. In wildlife studies, transmitter attachment methods are a critical aspect, since they determine not only the quality of the data obtained but also animal welfare. In research design, both the mounting method and the technical characteristics of transmitters and receiving antennas are decisive factors for telemetry success.

Attachment methods must adapt to the morphology, weight, and behavior of the species. Medium and large-sized mammals often carry collars, while birds use harnesses designed not to interfere with flight. Insects and small vertebrates generally require non-toxic adhesives to fix transmitters to the exoskeleton or feathers, although duration is usually limited. In species that tolerate greater manipulation, subcutaneous implants can be used, though these require specialized training and entail risks related to stress and survival.



Transmitters are composed of a quartz crystal calibrated to emit at a specific frequency (commonly between 150-151 MHz in Europe and North America), a power source—usually lithium or silver batteries—, a mounting system, and a transmitting antenna. Some transmitters also incorporate sensors to record physiological (temperature, heart rate, activity) or behavioral variables (movement, inactivity, mortality).

The design of the transmitting antenna is also key. Transmitters often include whip antennas made of stainless-steel wire, offering versatility and efficiency in signal propagation. Another option is loop antennas, built from copper plates in collar form, where the antenna itself is part of the mounting system. Antenna length and thickness are directly related to the transmission frequency and must not be altered, since cutting or bending would seriously compromise signal range. The most sensitive point is the junction between antenna and transmitter: if it breaks,

signal power is lost, making animal location difficult. For this reason, manufacturers typically reinforce this junction with protective materials.

The receiving subsystem is composed of receiving antennas and a radio unit that amplifies and translates the signal into audible or digital information. Omnidirectional antennas, such as dipoles, allow detection of transmitter presence in a general area but do not provide direction. In contrast, directional antennas, such as Yagis, are the most widely used in wildlife telemetry at frequencies above 140 MHz. These can be portable (2-3 elements) or fixed (up to 12

elements), and are notable for their high gain, allowing precise identification of signal direction. Other variants include circular or paddle antennas, useful at lower frequencies (<100 MHz) and often applied in aquatic fauna studies, as well as Adcock H-antennas, which have directional limitations but are practical in contexts such as fish tracking in rivers.

Finally, receivers—both analog and digital—amplify the signal

and make it usable. Analog models, although older, remain in use due to their proven durability in extreme conditions, while digital receivers offer greater versatility and the ability to manage multiple frequencies simultaneously.

Together, the correct choice of attachment method, transmitter, antenna, and receiver not only ensures reliable data collection but also minimizes disruption to the tracked animal's behavior and survival. These techniques have proven effective in mammals, birds, fish, and reptiles, groups with relatively stable morphology over their life cycle. In telemetry, the main technical limitation is transmitter weight, which must not exceed 5-10% of body mass to avoid impairing locomotion. When additional sensors are included to record physiological variables—such as body temperature, heart rate, or activity—transmitter size and weight increase, reducing battery life and accentuating operational constraints.

While telemetry has been consolidated in vertebrates, applying it to small animals—particularly insects—remains a major challenge. Their biology and life cycle include highly differentiated stages (egg, larva or nymph, pupa, and adult), during which morphology, physiology, and behavior change drastically. Unlike vertebrates, which maintain stable body structures, insects undergo successive molts of the exoskeleton and, in many cases, complete or incomplete metamorphosis. These transformations hinder the application of tracking devices and have limited telemetry studies mainly to large-bodied adults with strong flight, the only ones capable of carrying transmitters without severely compromising performance.

In 2021, Walter and colleagues proposed an alternative real-time tracking system based on short-wave infrared (SWIR) radiation, using ultralight photoluminescent tags and rapid movement detection with minimal environmental interference. To test this, they developed the SWIRD (Short Wave Infrared Detection System), consisting of a detector sensitive to 1400 nm radiation and photoluminescent PL-tags made of passivated lead sulfide quantum dots, weighing ~12.5 mg and 5 mm in diameter. These tags required no antenna or battery, drastically reducing flight impact. Field trials were carried out in a natural meadow flight arena with bumblebees (*Bombus spp.*) and hummingbird hawk-moths (*Macroglossum stellatarum*). The system recorded positions at 102 Hz with <10 ms latency.

Results demonstrated real-time tracking of individual flights with enough precision to capture rapid maneuvers and complex

trajectories. Tagged bumblebees displayed normal foraging behavior and were tracked across consecutive flights without tag removal. In moths, multi-minute flight sequences were recorded, with temporal resolution 300 times higher than traditional harmonic radars.

Wacker (2024) hypothesized that VHF transmitters could be effectively applied to large carpenter bees (*Xylocopa valga* and *X. violacea*), with automated reception systems offering greater efficiency and data volume than manual tracking. Research at Neusiedler See-Seewinkel National Park, Austria, captured fifteen carpenter bees, selecting the largest individuals to maintain transmitter-to-body mass ratios under 40%. Active VHF transmitters of 180 mg ($24.5 \pm 5.6\%$ of body weight) were attached to the thorax. Tracking combined manual Yagi antennas with ten fixed receiving stations across 8 km². Data were processed with azimuthal telemetry (ATM) and continuous-time movement models (ctmm).

Twelve of fifteen bees flew successfully with transmitters; three *X. violacea* failed to take off due to load. Tracking duration ranged from 45 minutes to 47 hours (mean 5.9 h). Manual tracking produced ~20 high-precision localizations per bee, but with low spatial coverage. Automated stations yielded up to 1561 records per individual, though with greater spatial uncertainty due to station density and electromagnetic interference. Activity ranges varied from 0.02 to 19.1 km² (mean 4.61 ± 7.94 km²), larger in *X. valga* and much smaller in *X. violacea*, likely constrained by transmitter weight. Device recovery was difficult, with frequent losses due to detachment or distorted signals.

Limitations included temporary signal loss when vegetation blocked tags, rotation-induced signal occlusion, and restricted detector field of view requiring continuous tracking. Despite these challenges, the study highlighted a technological innovation: replacing heavy antennas and transmitters with ultralight optical tags and real-

Sophia Gultzo (right), a master's student in CSU's Mola Lab, and Zella Benson search for bumblebee nests using radio telemetry near Red Feather Lakes.

Photo: Colorado State University, Fort Collins, Colorado



time SWIR detection. Although experimental, results show potential to overcome previous limitations and advance toward more precise, less invasive tracking of small flying insects in natural conditions.

Beyond VHF or radar telemetry, complementary “tagless” approaches are emerging, where movement is recorded via video rather than transmitters. This belongs to the field of Movement Ecology, raising the question of whether flying insects can be tracked with UAVs (drones) equipped with overhead cameras. Image-based tracking has proven effective for reconstructing 2D and 3D trajectories at >1 Hz sampling in laboratories, semi-natural insectaries, and natural environments.

Using drones as telemetry receivers for insects offers an innovative solution to overcome range and line-of-sight limitations of ground tracking. Conventional VHF telemetry relies on portable antennas or fixed stations with reduced detection range (~150-500 m) and high dependence on terrain and obstacles (Kenward, 2001). In contrast, UAVs with VHF receivers elevate the antenna and improve line-of-sight, increasing coverage and detection probability. Field validations show clear improvements over manual tracking, e.g., triangulating RSSI signals from drones.

RSSI (Received Signal Strength Indicator) is a measure of the signal intensity received by a radiofrequency receiver. In telemetry, RSSI serves as an indirect estimate of distance between animal transmitter and receiver (antenna or drone). Practically, stronger signals (higher RSSI) indicate proximity; weaker signals (lower RSSI) suggest distance or propagation obstacles. Traditionally, RSSI is measured manually by rotating directional antennas like Yagis, triangulating signal origin. With drones, this technique has been modernized: UAVs log signal strength variations while moving, enabling real-time position triangulation with greater speed and coverage.

Where ground telemetry yields sparse location points, UAVs can rapidly cover wide areas, follow dynamic trajectories, and adapt to hard-to-reach species in open habitats. Off-the-shelf

commercial platforms now exist, compatible with standard VHF tags and consumer drones, already applied across taxa including insects (Wildlife Drones, 2023). For smaller species, non-invasive alternatives are under development, such as miniaturized harmonic radars mounted on UAVs or aerial vision systems with automated detection algorithms, which can record high-resolution trajectories in open field. Complementarily, ultralight SWIR detectors can be mounted on UAV gimbals, integrating very low-weight optical tags with real-time tracking capabilities, offering a promising path for studying moths and bees in heterogeneous environments.

New insect tracking technologies, such as miniaturized VHF transmitters, ultralight photoluminescent tags (SWIR), harmonic radars, and drones equipped with receivers or cameras, are transforming telemetry by overcoming the limitations imposed by insects’ small size and mobility; these innovations allow the collection of high-resolution, real-time data with minimal impact on the organisms, which is key to deepening our understanding of their biology, ecology, and behavior, while also providing valuable tools for biodiversity management and the control of agricultural and public health pests.

~ Erika VA7ISI/HJ1ISI

Erika was profiled in The Communicator (March 2023):

<https://archive.org/details/sarc-communicator-2023-03/page/106/mode/2up>

How do you outfit a bee with a transmitter?

<https://www.youtube.com/watch?v=AFIKXcprxe8>





Digital Library of Amateur Radio and Communications

What's New at DLARC — October 2025

by KAY SAVETZ K6KJN

Greetings from — not DLARC Headquarters in Oregon, but from Internet Archive headquarters in San Francisco, California.

Earlier this week the Archive held a party to celebrate the milestone of [one trillion web pages](#) archived in the Wayback Machine. The [Wayback Machine](#) is a tool that has been backing up the web since 1996, then lets people see websites as how they used to be — and websites that no longer exist at all. A trillion pages saved is an amazing milestone, and I'm thrilled to be here in the Great Room at Archive HQ to celebrate with colleagues and community.

Last month I mentioned the addition of 80+ issues of Radio Communications Monitoring Association's [RCMA newsletter](#). If you've already managed to read all of those, don't fret because we have found and scanned [another two dozen issues](#) from 1979 through 1985. (The collection is filling in nicely, but if you have any issues that we lack, let me know.)

We added [170 newsletters](#) from the "Association of Clandestine (radio) Enthusiasts". Their monthly newsletter was called A*C*E: dedicated to pirate radio and the "clandestine listening" hobby. It was published from about April 1982 through September 2005. Founded by Darren Leno, an active pirate DXer, Leno operated the club and newsletter for the first few years. Later, it was headed up by others. It included profiles

or interviews of pirate stations, regular columns, and technical articles. During its early-to-mid 1980s heyday, it also included articles and loggings of spy-number stations. For most of modern pirate radio history, the A*C*E was the source for the exchange of logs and maildrop information for pirates. We scanned some issues from paper, then I found many more issues that others had scanned.

California Historical Radio Society sent a batch of videotapes [that we've digitized](#), including several tapes of Military Radio Collectors Group and Military Radio Restoration Group [meetings and presentations](#) from 1998 through 2001.

For newsletters that are less clandestine and more ham radio, we've added 28 issues of [GroundWave](#), the newsletter of the Saint Paul (Minnesota, USA) Radio Club.

Hundreds of newly scanned radio manuals continue to arrive in the [DLARC Manuals collection](#) — here's the link with the newest material on top. This is largely material from last summer's raid of Fair Radio Sales, with oodles of military radio guides, service and repair manuals, and schematics. That collection is pushing 8,500 items, with 2,150 added so far in 2025.

Something else I've been working on that's still in progress, but not as finished as it will be. I dug up a trove of Usenet newsgroup posts about amateur radio. Usenet was the discussion board of the early Internet. Well before the web, Usenet was one of the ways Internet strangers



found each other to discuss myriad topics. There were a lot of Usenet discussion groups about radio, and some were very active.

So now DLARC has text and pdf versions of some of these discussions. There's an archive of the Usenet group [net.ham-radio](#) from 1981 through 1986, and one of the group [net.ham-radio.packet](#) from 1985 to 1986. In 1987 or so, Usenet groups were all renamed and reorganized (in a process unsurprisingly called the "Great Renaming".) Of the renamed groups, we have [rec.radio](#) from 2000-2004, [rec.ham-radio.packet](#) (1987-2004) and [rec.radio.amateur.digital](#) (2000-2004). I'm not quite sure what differentiated digital from packet in these discussions – I suppose all packet radio is digital, but not all digital radio is packet. And finally (for now) the group [rec.ham-radio.swap](#) from 1989 through 2005. They are an incredible trove of radio conversations, all full-text searchable, of course.

I've added these all to the [DLARC E-mail Lists and Usenet archive](#), which also has radio-related email discussion groups going back to the dawn of the Internet age. I say this is "not as finished



as it will be" because I have archives of 15 other Usenet newsgroups that aren't ready for prime time, including discussion groups about space communications, Citizens Band, DXing, and more. I'll let you know when those are polished and easier to use.

Digital Library of Amateur Radio & Communications is funded by a generous grant from Amateur Radio Digital Communications ([ARDC](#)) to create a free digital library for the radio community, researchers, educators, and students. If you have questions about the project or material to contribute, contact me at kay@archive.org.

DLARC want list: <https://archive.org/details/dlarc-wantlist>

~ Kay K6KJN

Internet Archive's Program Manager,
Special Collections

Just some of the material available in the DLARC library

Magazines	Conference Archives	Audio
73 Amateur Radio Today	Comm Academy	Amateur Radio Newsline
Coop's Satellite Digest	Computer Networking Conf.	California Historical Radio Society News
DXing Horizons	Digital Communications Conf.	Glenn Hauser's World of Radio
Florida Skip	FOSDEM radio presentations	International Radio Report
Mobile Radio Technology	GRCon GNU Radio Conference	National Radio Club DX Audio Service
Monitoring Times	HamSCI	RAIN Report
NZART Break-In	International EME Conference	Plus
Radio & Television News	MicroHams Digital Conference	Historical callbooks
Radio Craft	Pacificon	40,000+ newsletters
RTTY Journal	QSO Today Virtual Ham Expo	Radio catalogs
Telegraphic Journal and Electrical Review	Software Defined Radio Academy	College radio archives
VHF Communications	...and more	Early Internet ham radio discussions
...and many more		Robert B. Cooper's personal archives

ARDF Canada

At the World Championship 2025 in Lithuania

by NICK ROETHE DF1FO



This year's ARDF Championship, the 22nd, was held in and around Brisonas in Lithuania, a 90 minutes drive from the capital Vilnius. It is just a two hours flight from my home town in Canada's Fareast (= Stuttgart). It was my 5th World Championship. I was the only Canadian participant.

25 countries had sent a total of 310 competitors (plus some visitors/fans). Russia did not participate because they consider all European Union countries as hostile; and China did not participate, because Lithuania has diplomatic relations with Taiwan. So be it.

The event was very well organized by the Lithuanian team. The terrain and maps were (mostly) excellent, the weather pleasant, and everything worked flawlessly. They even had

enough buses, so that everyone found a seat (quite unusual!).

The schedule (for my age group) was:

- 8/16 Registration and Opening
- 8/17 2m Classic
- 8/18 Sprint
- 8/20 Foxoring
- 8/21 80m Classic and Hamfest

You can find all Results, Maps, Medal Statistics at: <https://ardf.darc.de/contest/25081721/25081721.htm> And a lot of official Photos at: <https://eu.zonerama.com/FotoNecik/1500696>

The opening and the medal ceremonies were held in an outside amphitheatre close to the river Memel:

2m Classic

The map for this day looked very white, a lot of easily runnable terrain. I had to find three controls, for the first two I fought my way following my bearings. The white was mostly a light green (undergrowth with hidden dead trees) but passable, and with a little luck I found these controls in 12 minutes each. The third control was a bit further away, but this time there were trails in my general direction, and only the last 200m were hard fighting through breast-high dense vegetation. Mostly trails again to the finish, 65 minutes total run time. A good run by my standards, so I hoped to make it into the Top Ten.



To my surprise, pretty much everyone I talked to at the finish said, that the terrain was awful, with unpassable canyons and knee-deep mud, and that they got a lot of confusing bearings and ran in circles.

Obviously this has been my lucky day and in the end I was in 3rd place of the 32 competitors in M70 - a bronze medal! For me that is the first ever individual medal in a World Championship, in 15 years!, and I think, it is also the first medal ever for Canada!

Sprint, Foxoring, 80m Classic

The remaining three runs, all on the 80m band, went okay for me - I found all my controls, stayed well in time, did not hurt myself, had fun, and ended up somewhere in the midfield. All good by my standards.

Video: <https://df1fo.darc.de/2mM701.mp4>

Hamfest

A World Championship is always like a big family reunion. I've known many of the other participants for 10 to 20 years. Many of them use receivers based on my designs and since the actual runs take only 1 to 2 hours, there is always a lot of time left for technical discussions or chit-chat.

It is customary to exchange little presents during the Hamfest on the last evening. Team Canada - my wife supporting me - gave away 100 Teddybears in many colours. They were a big success! We got interesting stuff in return.

In 2026 there will be a Region 1 (European) Championship in Romania. The next World Championships will be held in Korea in 2027.

~ Nick Roethe DF1FO
df1fo@t-online.de



My medal was handed over by Ken Harker, WM5R, IARU R2 ARDF coordinator.

Giving away the teddybears





A Special Interest Group for the iCOM 7300, 7610, 9700 and other compatible models

Harnessing the LEO Satellites:

Integrating SkyRoof with the Icom IC-9700

by JOHN SCHOUTEN VE7TI



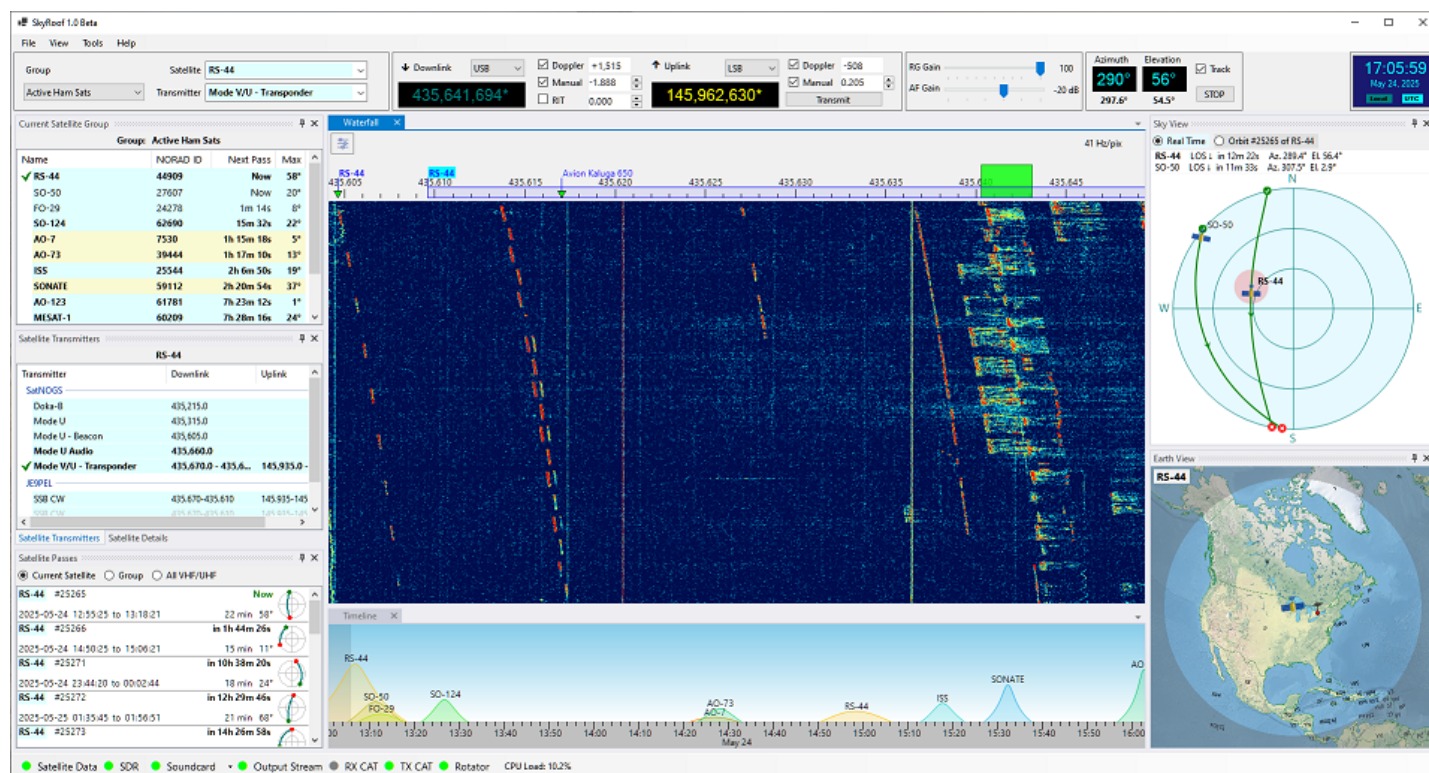
**John Schouten
VE7TI**

Has both an iCOM 7300 and 9700 and is fascinated by the 'hidden' features of these transceivers.

Although this is written with the iCOM IC-9700 in mind for seamless amateur radio satellite operations, the principles may be applied to many other transceivers that have CAT capability.

In the ever-expanding realm of amateur radio, where enthusiasts chase signals across the vast expanse of space, the convergence of cutting-edge software and robust hardware opens portals to the stars. Enter SkyRoof, a sophisticated satellite tracking and control application developed by Alex Shovkoplyas

VE3NEA, and the Icom IC-9700, a powerhouse VHF/UHF transceiver revered for its precision and versatility. Together, they form a dynamic duo for working amateur radio satellites—those orbiting beacons transmitting voice, data, and telemetry to operators worldwide. This integration hinges on CAT (Computer Aided Transceiver) control, a protocol that allows software like SkyRoof to command the radio's frequency, mode, and other parameters in real-time, synchronizing with a Low Earth Orbit (LEO) satellite's Doppler-shifted signal as it hurtles



across the sky at 17,000 miles per hour. For the satellite operator, this setup transforms chaotic manual tuning into an automated symphony, enabling contacts with hams in distant continents via linear transponders on birds like AO-91 or FO-99.

As of September 2025, with the amateur satellite population exceeding 100 active LEOs according to AMSAT reports, mastering this configuration is not just a technical exercise but a gateway to global camaraderie. [SkyRoof's user guide](#), particularly its [CAT control section](#), demystifies the process, emphasizing the use of intermediary tools like [Hamlib's rigctld.exe](#) to bridge the gap between PC and radio, ensuring compatibility with the IC-9700's CI-V interface.

This article delves into the setup, operation, and nuances of this pairing, offering a roadmap for novices and veterans alike to elevate their satellite operations from sporadic successes to routine triumphs. To embark on this cosmic journey, one must first appreciate the foundational hardware: the Icom IC-9700. Launched in 2019, this all-mode transceiver

covers the 144-148 MHz (2m), 430-450 MHz (70cm), and 1200 Mhz (23cm) amateur radio bands, though its satellite prowess shines on VHF/UHF. With 100 watts of output, dual receivers, and a built-in spectrum scope, it's ideal for satellite work, where simultaneous uplink and downlink frequencies demand split operations.

The IC-9700's CAT system operates over a USB-serial interface, presenting as virtual COM ports (typically COM9 and COM10 on Windows setups) that communicate via the CI-V protocol at baud rates up to 115200. This high-speed link is crucial for the rapid frequency corrections SkyRoof performs to counter Doppler effects—up to 10 kHz shifts on uplink and downlink for low-Earth orbiters. Ensure your IC-9700 is updated to the latest firmware via Icom's site; as of mid-2025, version 1.40 addresses minor CAT stability issues reported in satellite-heavy use.

Physically, connect the radio's USB-B port to your computer using a high-quality cable—avoid cheap knockoffs that introduce latency and noise ([see The Communicator September-October 2015 SIG](#)

[column](#))—and verify the COM ports in the Windows Device Manager. The lower-numbered port, say COM9, handles CAT commands, while the higher one might be for audio.

With hardware humming, it's time to summon [SkyRoof](#), a free, open-source tool hosted on GitHub, designed specifically for satellite

enthusiasts. Download the latest release from [ve3nea.github.io/SkyRoof](#), install it on a Windows 10/11 machine (macOS/Linux users can adapt via Wine, though Windows is native), and launch the intuitive interface. SkyRoof's dashboard greets you with orbital predictions, pass schedules, and a world map dotted with satellite footprints—already a step above basic logging software like HRD or SatPC32.

With CAT humming, satellite operations bloom into a fluid ritual

But the magic unfolds in the CAT configuration, where SkyRoof doesn't directly interface with the radio; instead, it proxies through TCP-enabled daemons like rigctld.exe from Hamlib or skycatd.exe from the companion [SkyCAT project](#), allowing networked control and modularity.

Configuring CAT control begins with selecting your daemon, and for the IC-9700, Hamlib's rigctld.exe is the go-to, as SkyCAT's command files cover fewer Icom models comprehensively. Head to the Hamlib GitHub releases and snag [hamlib-w64-4.5.5.exe](#)—I found a later version... BUT newer versions post-2025 introduced quirks for me, so stick to this stable iteration for SkyRoof compatibility. Install it to the default path, *C:\Program Files\hamlib-w64-4.5.5*, and

note the folder housing *rigctld.exe*. Now, craft a shortcut for effortless launching: right-click the executable, add arguments *-m 3081 -r COMx -s 115200 -vvvvv*. Here, *-r COMx* is your port number, mine is *-r COM9* and *-m 3081* is the Hamlib model ID for the IC-9700 (cross-reference the wiki for updates or to look up your transceiver's access code), *-s* cranks the baud to maximum for snappy responses, and *-vvvvv* unleashes verbose logging to a file—indispensable for debugging when your first pass fizzles.

Double-click this shortcut before firing up SkyRoof; rigctld will lurk in the system tray, listening on TCP port 4532 by default, ready to relay commands like "F 145500000" to tune the radio to 145.500 MHz. In SkyRoof, navigate to *Tools > Settings*, and under the CAT tab, toggle Enabled for both RX and TX sections. For a unified setup, set Host to *127.0.0.1* and Port to 4532 in both—ideal if using the IC-9700 for transmit while pairing with an SDR like an RTL-SDR for receive via ExtIO plugins (*see below*). If splitting rigs (e.g., IC-9700 for TX, another for RX), spin up a second rigctld instance on port 4533 with adjusted arguments, and mirror the settings. Fine-tune the Delay slider to 100ms initially; bump it to 200ms if the IC-9700's CI-V bus chokes on rapid polls, a common hiccup during high-elevation passes. Disable Log Traffic (that *-vvvvv* entry in your shortcut) unless troubleshooting—it's a CPU hog that floods your console with hex dumps.

A nifty toggle, *Ignore Dial Knob*, wards off accidental detunes if you're twiddling the big wheel mid-contact; set it true for scripted ops. Right-click the frequency display on SkyRoof's toolbar to enable "*Show Corrected Frequency*," which overlays the Doppler-adjusted uplink/downlink—vital for nailing the transponder passband without mental math. Warnings abound: mismatched baud rates brick the link, so sync your IC-9700's menu 60 (CI-V baud) to 115200. And if rigctld balks, the *-vvvvv* logs reveal culprits like port conflicts or model mismatches—I've heard of operators waste hours on COM10 when COM9 was the key.

With CAT humming, satellite operations bloom into a fluid ritual. Fire up SkyRoof's pass predictor, select a linear transponder satellite



like AO-27 (downlink 436.795 MHz, uplink 145.850 MHz, mode FM), and watch the AOS (Acquisition of Signal) timer tick down. As the bird crests the horizon, SkyRoof adjusts the frequency: CAT commands the IC-9700 to the corrected uplink while displaying the downlink on your receiver. Key the mic or inject AFSK for digital modes like APRS, and behold—signal reports from Europe flood your speakers, Doppler seamlessly tracked without finger fatigue. For FM repeaters like those on CubeSats, the IC-9700's 15 kHz bandwidth shines, but enable SkyRoof's auto-mode switching to flip from USB to FM on the fly.

Although I don't have a satellite Az-El rotator, using either an Arrow antenna or home-built tape measure Yagi, advanced users can add in rotator control via EasyComm protocols, syncing an antenna like the Elk log-periodic with SkyRoof's azimuth/elevation outputs for hands-free tracking.

Troubleshooting

If frequencies lag, audit the delay; for dropouts, verify USB power—the IC-9700 draws 500mA, taxing laptop hubs. Hamlib's occasional command gaps (e.g., imperfect split-VFO handling) nudge some to SkyCAT for Icom-native scripting, but rigctld suffices 95% of the time.

In 2025's crowded skies, with Starlink's constellation sparking RFI woes, this setup's precision cuts through noise, enabling QSOs with OSCAR 7, the grizzled 1974 veteran still chirping after 50 years. Beyond contacts, this duo fosters experimentation: beacon monitoring on 10 GHz with downconverters, or EME (Earth-Moon-Earth) via the IC-9700's DSP noise reduction. SkyRoof's logging integrates with ADIF for eQSL uploads, timestamping passes with TLE (Two-Line Element) accuracy.

The true allure lies in community: The [Skyroof forum](#) is a treasure trove of hints and willing assistance. Forums like [AMSAT-BB](#) buzz with IC-9700 tales, from ISS voice passes to SSTV downloads.

SDR Receive

One of the amazing Skyroof features is the ability to use an inexpensive USB RTL-SDR dongle as the receiving portion of your set-up. As good as the IC-9700 is, I found that my 10-year old dongle proved easier to use, with an amazing waterfall display of satellite signals. SkyRoof uses the Soapy SDR engine to interface with the SDR radios. Currently it supports Airspy, AirspyHF+, SDRplay, RTL-SDR, HackRF, and PlutoSDR, but it may be able to use other SDR devices. Connect your SDR device to the computer, then click on Tools > SDR Devices in the main menu. This will open the SDR Devices dialog where you can select your device and parameters.

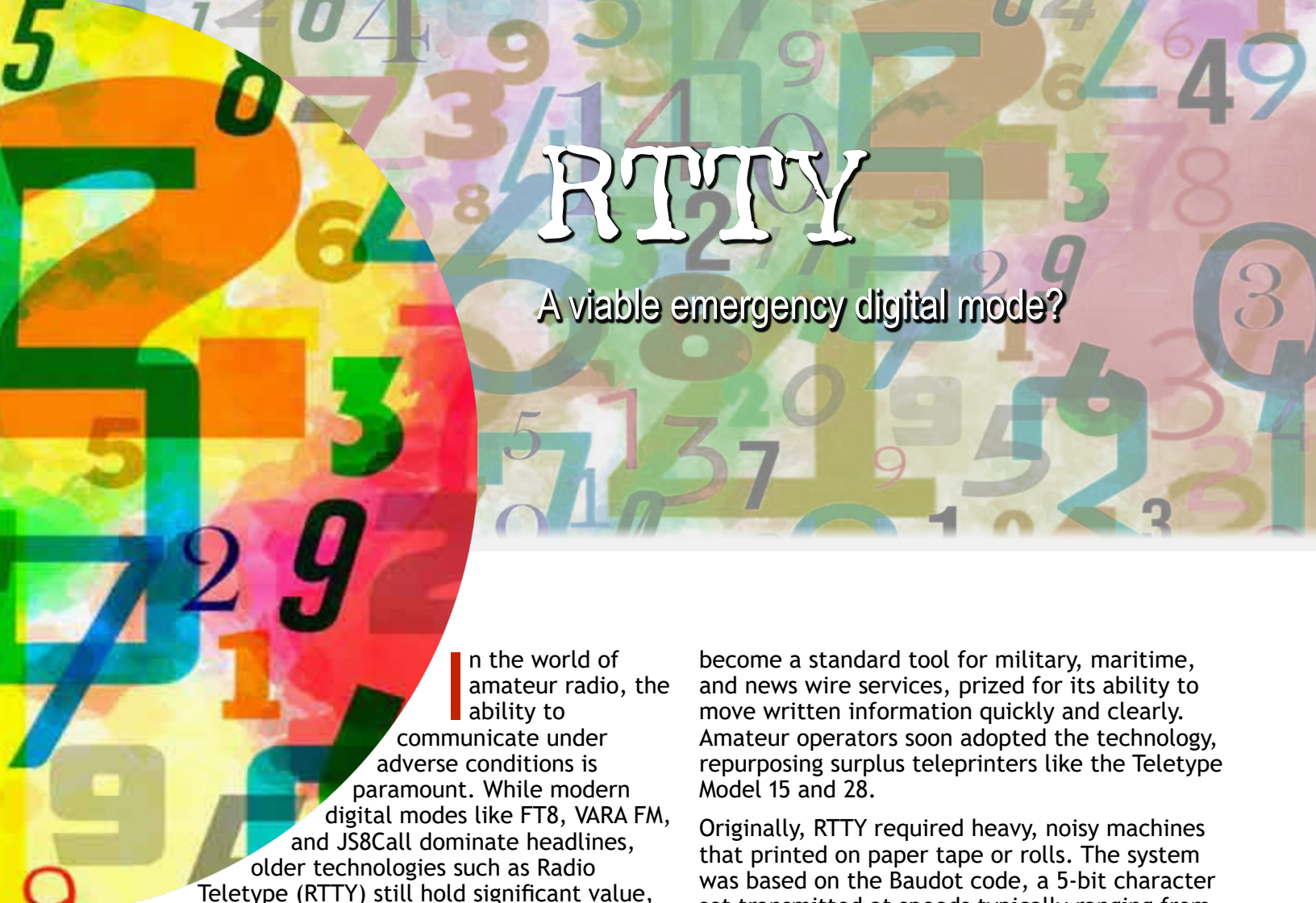
Ultimately, SkyRoof and a compatible transceiver will enhance your space comms, especially when turning a \$1,500 radio and free software into a dream satellite console. As solar cycle 25 peaks, with flux at 150+, expect auroral-enhanced passes; this rig's sensitivity (0.11 μ V on 2m) captures the faintest whispers.

In wrapping this column, remember: satellite radio isn't about gear—it's the thrill of a 437 MHz signal bridging via space. Dive in, tune up, and let the sky call.

~ John VE7TI

Check out the new [iCOM IC-7300MK2](#) on YouTube and on the back cover





RTTY

A viable emergency digital mode?

In the world of amateur radio, the ability to communicate under adverse conditions is paramount. While modern digital modes like FT8, VARA FM, and JS8Call dominate headlines, older technologies such as Radio Teletype (RTTY) still hold significant value, particularly in emergency communication (EmComm) scenarios. RTTY is one of the earliest digital modes adapted for amateur use, and its continued relevance rests on its simplicity, robustness, and independence from complex infrastructure. On the VHF bands, where line-of-sight coverage and local communication dominate, RTTY can serve as a reliable and straightforward method of passing written traffic when voice or internet-linked systems are unavailable.

This article explores how RTTY can be leveraged as an emergency VHF digital mode, examining its history, operational principles, available hardware and software, and its advantages and limitations in a modern EmComm context.

A Brief History of RTTY

Radio Teletype traces its origins to the early 20th century, when mechanical teleprinters were first connected to radio circuits to transmit text messages. By the 1940s and 1950s, RTTY had

become a standard tool for military, maritime, and news wire services, prized for its ability to move written information quickly and clearly. Amateur operators soon adopted the technology, repurposing surplus teleprinters like the Teletype Model 15 and 28.

Originally, RTTY required heavy, noisy machines that printed on paper tape or rolls. The system was based on the Baudot code, a 5-bit character set transmitted at speeds typically ranging from 45.45 baud to 75 baud. With the advent of personal computers and sound card interfaces, the mechanical machines were replaced by software decoders, making RTTY lighter, faster, and more accessible.

While commercial and governmental use of RTTY declined with the advent of digital packet and internet-based systems, the amateur community continues to use it for contesting, casual QSOs, and, importantly, for emergency communications where text-based messaging is crucial.

Why RTTY for Emergency Communications?

Modern EmComm groups often rely on advanced modes such as Winlink over VARA FM or PACTOR, which allow for high-speed email-style messaging. However, these modes require specialized modems, licenses, or robust computing resources. RTTY, on the other hand, offers several unique advantages:

Simplicity - RTTY uses a straightforward frequency-shift keying (FSK or AFSK) scheme. This makes it easy to configure with minimal hardware.

Readability under stress - Text messages are easier to log and forward than spoken traffic, reducing errors in relayed messages.

Compatibility - Almost every digital software suite for amateur radio supports RTTY, ensuring interoperability between stations.

Minimal infrastructure - Unlike internet-linked systems (D-STAR, DMR, Fusion, Echolink), RTTY operates entirely peer-to-peer with no dependency on repeaters or servers.

Proven reliability - Decades of use in military and maritime applications attest to its effectiveness.

These qualities make RTTY a practical fallback for EmComm groups preparing for scenarios where infrastructure is compromised, or where training new operators on a simple, durable digital mode is desirable.

How RTTY Works on VHF

On the VHF bands, RTTY is typically transmitted using FM or SSB modulation, with the digital tones applied as audio input to the transceiver. The system relies on two audio tones, often separated by 170 Hz, representing binary “mark” and “space.” Software on the receiving side decodes these tones back into text.

In an emergency, a VHF RTTY net could be established to pass formal traffic between stations within line-of-sight or via simplex repeaters. Because VHF propagation is generally local, this suits emergency response teams working within a city, county, or regional area, where written traffic such as status reports, supply lists, or medical information needs to be exchanged quickly and accurately.

Hardware for VHF RTTY

RTTY can be implemented with a variety of hardware setups, ranging from sophisticated to very simple.

1. Radios

VHF FM transceivers - Most 2-meter or 70-centimeter radios capable of handling audio input/output can be used. Handhelds can work, though base or mobile units with stable power supplies are preferred for reliability.

All-mode VHF transceivers - Radios with SSB capability (such as the Icom IC-9700 or older multimode rigs) allow cleaner, narrower signals but are not strictly necessary.

2. Interfaces

Sound Card Interfaces - Devices like the Signalink USB or Rigblaster connect a computer’s sound card to the radio’s audio path and provide PTT (push-to-talk) control.

Direct Audio Cables - In a pinch, simple audio cables can be used to couple the computer’s audio output to the radio’s microphone input, and vice versa. VOX (voice-operated transmit) can sometimes eliminate the need for a separate PTT interface.

Terminal Node Controllers (TNCs) - Although more commonly associated with packet radio, many TNCs can generate RTTY tones, making them an alternative to computer-based setups.

3. Computers and Embedded Systems

Laptops and PCs - Any modern computer can run digital mode software, making them the most common choice.

Raspberry Pi or similar - Compact, low-power single-board computers are popular in field deployments because they run Linux versions of software like Fldigi.

Tablets/Smartphones - Some RTTY-capable apps exist for mobile platforms, though they are less common compared to PC software.

Software for RTTY on VHF

Numerous programs support RTTY, allowing flexibility in choosing the right platform for emergency deployments.

Fldigi - One of the most popular open-source digital mode suites. Runs on Windows, macOS, and Linux, and supports RTTY along with many other modes. Its logging, macros, and interface customization make it well-suited for emergency nets.

MMTTY - A lightweight, Windows-based program focused specifically on RTTY. It is widely used in contests but can also serve in emergency applications.

MultiPSK - A feature-rich application that supports dozens of modes, including RTTY. Its flexibility makes it a good tool for interoperability exercises.

Ham Radio Deluxe (HRD) - A commercial suite that includes RTTY capability along with rig control and logging.

JS8Call / WSJT-X (indirect use) - While not traditional RTTY, these modern weak-signal programs demonstrate the evolution of digital text modes. Some EmComm groups train on multiple systems to ensure interoperability.

In an emergency setting, Fldigi is often preferred due to its open-source availability, cross-platform compatibility, and integration with EmComm standards like NBEMS (Narrow Band Emergency Messaging System).

Strengths and Limitations of RTTY for EmComm

Strengths

Simplicity of training - Volunteers can learn RTTY basics quickly.

Low equipment requirements - No need for proprietary modems or internet access.

Resilience to congestion - Text messages can be passed even when voice channels are chaotic.

Historical interoperability - Nearly every EmComm group with digital capability can decode RTTY.

Limitations

Inefficient compared to modern modes - RTTY transmits at relatively low speeds (45-75 baud) and requires more bandwidth than newer digital modes.

Error-prone in noisy conditions - Unlike modes with forward error correction (FEC), RTTY has no built-in redundancy.

Supplanted by faster options - For email-style traffic or large data transfers, modes like VARA FM or packet are superior.

Limited weak-signal performance - Modes like FT8 or JS8Call perform better under very low SNR conditions.

Despite these limitations, RTTY's strengths as a fallback, universally understood, and infrastructure-independent mode remain compelling.

Real-World Applications

Several amateur radio emergency service (ARES) and Radio Amateur Civil Emergency Service (RACES) groups still include RTTY in their digital mode drills. For example, during county-wide disaster simulations, VHF RTTY has been used to pass ICS-213 forms (Incident Command System message forms) between shelters and emergency operation centers.

Maritime groups and off-grid amateur operators also use RTTY as a backup for local text communication, citing its minimal setup requirements. Additionally, during severe weather events when voice nets are saturated, RTTY has been tested as a parallel data channel for written bulletins, reducing congestion and transcription errors.

Future of RTTY in Emergency Communications

While it is unlikely that RTTY will ever return to dominance in amateur digital communication, it remains a valuable skill set and tool in the EmComm toolbox. The continued availability of software support, coupled with the near-ubiquity of VHF radios among amateur operators, ensures that RTTY can be quickly deployed in emergencies.

For EmComm organizations, incorporating RTTY training alongside newer modes like VARA FM, JS8Call, and Winlink provides redundancy and flexibility. In a true emergency, having multiple options is preferable to relying solely on advanced, infrastructure-dependent solutions.

RTTY is a proven, time-tested digital mode that still has relevance for emergency communication on VHF. Its strengths—simplicity, accessibility, and independence from infrastructure—make it particularly useful as a fallback method of passing written traffic when more sophisticated systems fail or when rapid deployment is necessary. While it may not match the speed, efficiency, or weak-signal performance of modern digital modes, RTTY continues to earn its place in the EmComm toolkit as a reliable and effective means of communication between stations.

For amateur operators committed to preparedness, maintaining familiarity with RTTY ensures one more layer of resilience when the unexpected occurs.

~

W8EMV RTTY page:

- <https://vielmetti.typepad.com/w8emv/>
- <https://copaseticflow.blogspot.com/2025/09/project-toucans-rtty-2m-cq-decode.html>
- <https://www.galanto.com/en/rtty-radio-teletype/>

The IC-9700 is a complicated rig...

The iCOM IC-9700 is a fantastic tri-band transceiver, offering robust performance across the VHF, UHF, and 1200MHz bands. However, we have received feedback that its extensive feature set can be complex, sometimes leading to confusion that users find difficult to resolve on their own. This has occasionally resulted in owners performing a full reset to return the radio to its default settings and start from scratch. Below, we have outlined some specific instances that have come to our attention. If you have encountered a confusing situation with your own IC-9700, we would like to hear about it; we will address these challenges in future issues to provide clarity for the benefit of all 9700 users.

Here is glitch number one:

I have an IC-9700 tri-band transceiver but I just use it as a dual-band (VHF / UHF) transceiver. I don't have a 1200 MHz antenna; I use a triplexer to connect the IC-9700 to my VHF / UHF antenna (this protects the transceiver in case I inadvertently transmit on 1200MHz). Switching between the VHF & UHF bands is

easy: just press the "Main" control knob (or the "Sub" knob if you're using the IC-9700's dual watch function, which lets you simultaneously monitor two frequencies). If you operate in this fashion--as I suspect many people do, it's easy to forget that the IC-9700 is a tri-band rig.

Imagine my surprise when I recently pressed my Main control knob to switch from UHF back to VHF, but instead of the expected VHF frequency display I saw 1200MHz! Repeatedly pressing the Main control knob just toggled between UHF and 1200MHz. What happened to VHF? Had I lost all of my VHF settings, memories, etc.? Happily, no. It turned out that, while using the VHF band, I had been programming some additional memories into my IC-9700 and inadvertently touched the "1295.000 FM" button on the Band Stacking Register display. That changed my Main operating band from VHF to 1200MHz (with UHF remaining as my Sub band). The IC-9700 is a tri-band receiver, but only two bands (the so-called Main and Sub bands) can be operative at one time. So, how to change my Main operating band from 1200MHz back to VHF? By using the same procedure as noted above: open the Band Stacking Register, touch one of the VHF band keys and then touch the back arrow key to exit. Simple fix and my blood pressure is back down off the ceiling.

~





Pile-Up Control System

Take control of the pile-up!

by SANDER PD9HIX and ERWIN PA3EFR VAN DER HAAR

Every special event station (SES) and contest operator knows the thrill – and the chaos – of a true pile-up. The excitement of dozens of stations calling you simultaneously can quickly turn into frustration when QRM, doubles, and missed calls clutter the frequency. Wouldn't it be great if there were a way to bring order to that chaos without losing the fun of real-time operating?

Enter PUCS, the Pile-Up Control System, a fully open-source, web-based platform designed by and for radio amateurs. Born from the ingenuity of the Radio Scouting Fellowship PA3EFR/J, PUCS elegantly blends traditional ham ingenuity with modern AI-assisted software development. The result is a modular, flexible system that any club or individual can tailor to their own operating style – from large-scale SES activities to small club field days.

PUCS can be seen operational at pucs.pa3efr.nl

From Normandy to the Netherlands

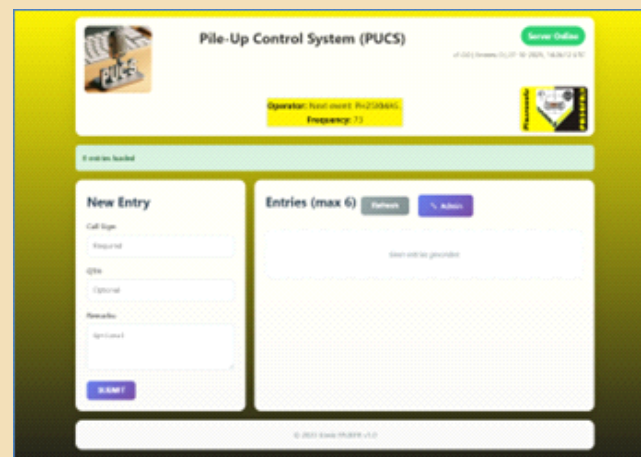
The idea for PUCS was sparked during an SES operation on the beaches of Normandy, where operators of [TM80DDAY](https://tm80dday.com) overheard multiple Australian colleagues discussing a private sign-up system for QSOs. Intrigued but unable to obtain the software, Erwin PA3EFR and his team decided to build their own version – and then share it freely with the world. With the help of AI tools and some Python wizard Barry, PC1K, PUCS was born. It was much later when Erwin decided to develop PUCS within his own environment.

Today, PUCS is freely available, fully documented, and open to anyone willing to experiment. It's more than just software – it's an invitation to collaborate, learn, and contribute to a smarter way of managing pile-ups.

What Makes PUCS Unique

At its heart, PUCS is a distributed system consisting of two parts:

- Frontend (commercial hosting): This is the public entry point where operators register their callsigns to join the queue. Think of it as a digital “waiting room” – transparent, fair, and visible to everyone.
- Backend (local PC): Here's where the magic happens. The backend checks QRZ.com logbooks every minute, automatically removes callsigns that have already been



worked, and provides an admin dashboard to manage the queue, export logs, and adjust settings on the fly.

The system uses Python's Flask framework, SQLite databases, and SocketIO for real-time updates — all standard, well-documented technologies familiar to many technically minded amateurs. It's simple enough for a club to host on a modest PC, yet robust enough to handle large SES events.

Open Source, Open Spirit

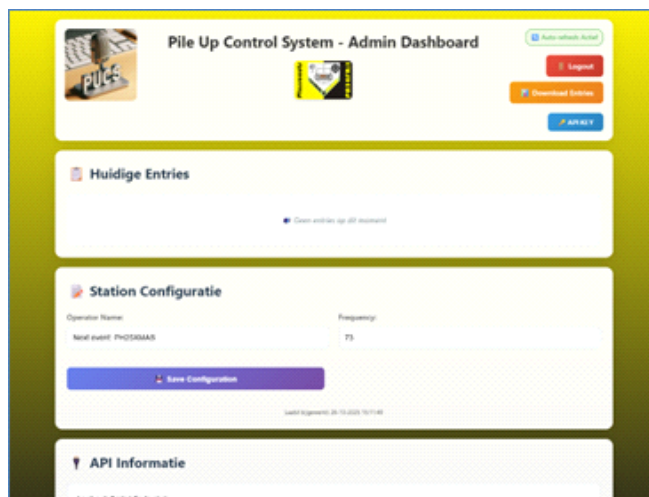
PUCS is more than a tool — it's a philosophy. The creators explicitly invite others to modify, enhance, and restyle the system to their own preferences. Whether you want to change the interface colors, add logging features, integrate digital modes, or redesign the operator dashboard, the code is yours to explore. There's no hidden agenda, no locked components — just open code and open collaboration.

All scripts, examples, and documentation are available on GitHub:

<https://github.com/PA3EFR/PUCS>

Why You Should Try It

PUCS is a perfect project for your club's next technical workshop. It offers practical lessons in networking, APIs, databases, and web hosting — all wrapped around a real amateur radio application.



Beyond that, it promotes fairness in pile-ups, gives weaker stations a chance to make contact, and even allows SWLs to log their participation.

So fire up your soldering iron if you must, but this time, your “kit” is made of code.

Download PUCS, make it your own, and bring calm to your next pile-up.

As Erwin, PA3EFR, says: “Ask AI as your friend for support — and enjoy your own moments of challenge!” On behalf of the [Radio Scouting Fellowship PA3EFR/J](#) we look forward to see you on our PUCS screens at a next special event occasion.

~ Sander PD9HIX



Drone Scan 3d Presentation

At our Feb 11, 2026 monthly meeting via Zoom, Rudi Wiedemann K7RAW will be presenting on [Drone Scan 3D](#). He will also be providing an introductory article for the next Communicator. Stay tuned!



Satellite Tracking

Looking back on 2025, and ahead into 2026

Our world of amateur radio satellites, an intersection of hobbyist ingenuity, educational outreach, and cutting-edge small satellite technology, has seen remarkable activity throughout 2025, with new launches, operational milestones, and forward-looking policy and hardware developments reshaping the landscape for operators worldwide.

At the forefront of recent achievements stands the successful deployment of HADES-R, launched on January 14, 2025, aboard SpaceX's Transporter-12 mission from Vandenberg Space Force Base in California; this 1.5U PocketQube, developed by AMSAT-EA, serves as the first dedicated replacement for the aging HADES-D (SO-121), which has provided faithful FM and digital repeater service for years, and within days of activation, telemetry reports flooded in from stations across the globe, confirming healthy power, thermal, and communication systems, while operators rejoiced at the return of reliable voice and packet contacts over Low Earth Orbit (LEO).

Complementing this success, AMSAT-EA queued up HADES-ICM for a March 14th launch on Transporter-13, ensuring continuity of this critical repeater chain and underscoring the rapid cadence of amateur satellite deployments enabled by commercial rideshare opportunities.

Meanwhile, Japan's Nihon University is poised to expand the linear transponder fleet with [Ten-Koh-2](#) is a satellite planned to be released from the ISS later this year (2025), with liftoff aboard JAXA's HTV-X cargo resupply mission to the International Space Station; this satellite will feature a 145/435 MHz SSB and CW transponder alongside a CW beacon on 5839.000 MHz, offering hams a high-fidelity analog pathway for voice and Morse code contacts.

Not all plans have proceeded smoothly, however—China's CAS-11 satellite, originally slated for an October 11, 2025, launch, was delayed due to payload scheduling conflicts, reminding the community of the logistical challenges even in an era of frequent small-sat missions. Despite such hiccups, legacy

satellites continue to deliver: AO-07, now a decade past the 2015 launch of its predecessor AO-85, still supports SSB and CW passes from surprisingly low elevations, while SO-50 remains a workhorse for FM satellite operators, recently enabling rare grid activations such as LL83GG from Oman; RS-44 has facilitated noisy but workable DX QSOs across continents, and Russia's UmKA-1 delighted the community in August 2025 by transmitting Slow-Scan Television (SSTV) images to commemorate the 50th issue of the Space-π digest and the anniversary of the historic KEDR satellite.

Looking ahead, the amateur satellite calendar brims with promise, particularly from the United Kingdom's SaxaVord Spaceport in the Shetland Islands, which is emerging as a key European launch site for PocketQubes and CubeSats. A single mission, exact date still to be confirmed, will carry an unprecedented cluster of ham radio payloads, including [AMSAT-EA's MARIA-G](#) (also known as HADES-F), a 1.5U PocketQube equipped with an FM voice relay, AX.25/APRS digipeater at 300 and 1200 bps, telemetry downlink, CW identification beacons, and even weekly riddle clues transmitted in Morse code to engage the global operator base; its sibling, UNNE-1 (HADES-E), will fly alongside it, offering similar communication capabilities while hosting an experimental Fraunhofer TS-UNB narrowband waveform designed to push the limits of LEO data transmission efficiency, with all data openly shared for research purposes.

Also on the manifest are Germany's [ERMINAZ-1U](#) and [ERMINAZ-1V](#) PocketQubes from AMSAT-DL, which will demonstrate digital store-and-forward messaging and novel experimental payloads, with engineering models proudly displayed at the HAM RADIO 2025 convention in Friedrichshafen; AMSAT-EA's GENESIS-MA and GENESIS-ME CubeSats, still in final integration,

promise multi-mode transponders blending analog and digital operations; and the Libre Space Foundation's QUBIK 5, SIDLOC-PQ-1, and SIDLOC-PQ-2, each focused on educational telemetry and Earth imaging to inspire the next generation of satellite builders. This single launch will dramatically expand the on-orbit amateur radio infrastructure, particularly in the realm of compact, low-cost PocketQubes, which have democratized access to space for universities, clubs, and individual experimenters.

On the innovation front, Japan's JAMSAT unveiled the "[Blueberry J](#)" project in August 2025, a next-generation multi-mode transponder module tailored for CubeSats, capable of simultaneous SSB, CW, and digital operation with improved linearity and power efficiency—prototypes are already being integrated into upcoming university missions.

Hardware for ground stations has also advanced: [FWCube Labs](#) released a portable VHF/UHF cube-style directional antenna in July 2025, optimized for satellite tracking with a compact, deployable design ideal for field operations and emergency communications.

Educational and experimental initiatives have flourished as well. In September 2025, the [ENSO satellite initiated a "treasure hunt"](#) by transmitting live GPS coordinates in its telemetry beacon, challenging operators worldwide to decode and plot its position in real time—a gamified approach that has boosted youth engagement.

The next year promises more development in LEO satellites and an initiative to bring access to satellites into the classroom as part of STEM based education.

~





Homebrew Mobile Antennas

by FRED STEVENS WA5LIE

June, 2025. Ran across county hunters website and dove down that rabbit hole, noticed that several west Texas counties were on the “needed” list, then started thinking about a road trip. Here’s where it gets funny: I have been QRT on HF for years and have no rig or installed antennas, certainly no mobile antenna. I called the guru in the local ham club, scored a loaner rig and an offer for a 20’ long receiver hitch mounted monstrosity (with tuner), which I declined. After all, I can make my own antenna. Then the fun started.

The plan was to go on the trip “sometime in early to mid Sept”. The wife had other plans, so she couldn’t go so I asked my bro, N5NK and he agreed. He also mentioned that the Texas QSO Party was happening then, also. OK, so we leave on Thursday before the TQP on Sat, get 2 days head start to try to give contacts without the TQP bedlam. So far, so good. Now to build the antenna.

Construction

One thing becomes crystal clear as you age, and that is that what you want to do and what your body lets you do aren’t always the same. My concept for the antenna was a rear mount, a mast of some sort 4 to 5 feet tall capped with a bugcatcher coil and a whip above that with a capacity hat at the top. That was the plan and in some other universe it might have been possible but not here, not in my shop. After trying many different iterations of cap hat design and spending a tremendous amount of time trying to get it right, I threw in the towel. No cap hat. Not this time.

I was trying to decide which material would be best for the lower mast when I stumbled across fiberglass rebar at a big box store. The ½” seemed to be just what I wanted. The 3/8” was perfect as spreaders but that’s a different project.

To have the strength and rigidity at the base, I decided to use about 5 or 6" black iron pipe and a pipe cap. The cap was drilled for a 3/8x24 stainless bolt and then the bolt was welded in place. (Fig 1)



Fig. 1



Fig. 2

The fiberglass rebar would then be epoxied into the pipe but later, after the connection and matching coil was ready. (Fig 2) I used #14 wire throughout. I had some Romex that I stripped for the insulated wire used as the matching coil and for the wire wrapped a couple of turns up the lower mast from that to the bugcatcher coil. (Fig 3 and 4)



Fig. 3



Fig. 5

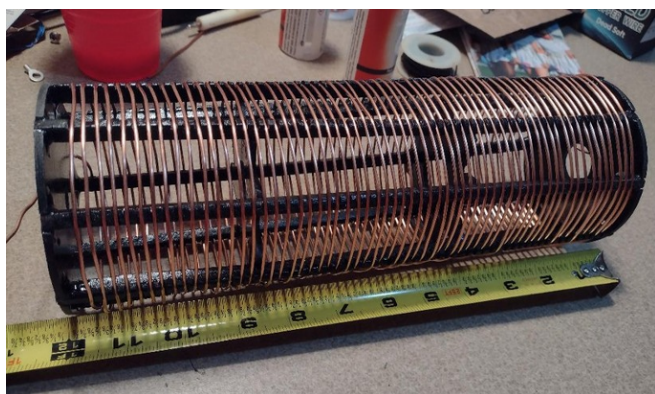


Fig. 4

At the top I used 1/2" CPVC fittings (one coupler and one end cap). The end cap was drilled to clear a 3/8" stud and a 3/8x24 nut was pressed into the cap, then glued to the coupler. (Fig 5) Before epoxying that assembly into place, though, another coupler was placed on the past at the bottom of the bugcatcher to stabilize it. Electrical tape was used on the rebar to center the coupler and top assembly before epoxy. Also, a length of 21mm heat shrink tubing covered the lower mast from the bottom of the bugcatcher to the RF connector assembly, about 4 feet.

After the epoxy cured, the bugcatcher coil was slid down onto the upper part of the mast. A wiring connector washer was fabricated from a piece of PC board so it would fit under the antenna spring and above the coil, using the coil top as a washer. The wire on the mast connected to a stainless, self-tapping screw on the bottom of the coil, along with the wire from the coil and a 14" length of coax braid which has an alligator clip on the other end.

The first upper whip was scrapped in favor of a 102" CB whip. Due to the flex in the rebar, the bottom of the whip was guyed to the roof rack on the car with a lightweight cord, sufficiently strong to hold the antenna in the wind but light enough to break under a heavy shock.

The hitch mount is a Harbor Freight unit that has a 16" x 2 1/2" x 1/4" steel piece that I welded to it. It extends about 2 feet rear of the bumper with the 3/8" mount hole close to the end so that the antenna clears the lift gate when open. Since it is that far back, reflective safety tape is a must, not only on the mount but also the black lower mast. If you think a 2" ball on the back of a pickup will ruin your day if you walk into it, try this sucker.

Operation

A VNA is highly recommended for tuning. With no turns of the coil shorted, there is a less than 1 SWR at 3 MHz. I would locate the different alligator clip placements by watching the VNA, then mark the locations with small tie wraps and note the band. 20M is almost at the top of the coil and is below 2:1 across the band.



15M also has a nice SWR null. 40M is a bit sharper but the autotuner worked with it. 80M is sharper still and the clip would have to be changed to use 75M SSB.

Conclusion

Since completed, the antenna has performed very well. I have worked all over the US with good reports and most recently into South America and France. I went on a west Texas county hunters road trip prior to and during the 2025 Texas QSO Party, logging about 1300 miles and many contacts with no antenna issues. Overall, I am very pleased with the antenna's performance and durability.

~ Fred Stevens WA5LIE

The genius logic of the NATO phonetic alphabet



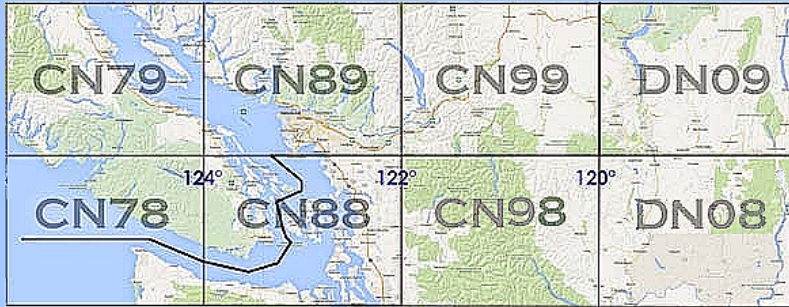
ABLE	NICKEL
BAKER	OBOE
CHARLIE	PETER
DOG	QUEEN
EASY	ROGER
FOX	SUGAR
GEORGE	TARE
HOW	UNCLE
ITEM	VICTOR
JIG	WILLIAM
KING	X-RAY
LOVE	YOKE
MIKE	ZEBRA

The video explores the meticulous and secretive history behind the NATO phonetic alphabet, clarifying that it is more accurately a spelling alphabet designed for clarity over noisy radio or phone lines, and was not actually invented by NATO. The need for such a system emerged in the 1870s with the invention of the telephone, as poor line quality led to frequent confusion between similar-sounding letters (e.g., C, D, E, G). Early solutions, such as the Western Union suggestion to follow a letter with a proper name like "D for Dora", were inconsistent. By World War II, various militaries had their own conflicting alphabets, prompting the rush creation of the "Able Baker" alphabet by the US Army Air Forces as a compromise between American and British preferences.

After the war, the International Civil Aviation Organization (ICAO), not NATO, took the lead, recognizing the "Able Baker" alphabet was insufficient for the burgeoning global civil aviation industry where many members did not speak English. Professor Jean Paul Vinay was tasked with creating a truly international alphabet, requiring each word to be easily pronounced and recognized by airmen of all languages and to have a similar spelling across English, Spanish, and French. While the initial 1952 ICAO alphabet was initially disliked by English speakers, extensive testing proved its superior intelligibility, leading to a few final, scientifically-backed adjustments. These final tests resulted in changing words like "Cocoa" to "Charlie," "Metro" to "Mike", and finally "Nectar" to "November" to avoid confusion with "Victor". The 26 words were ultimately finalized in 1956 remaining a testament to years of linguistic experimentation and international cooperation.

The video can be watched here: [The genius logic of the NATO phonetic alphabet](#)

~ RobWords



2m QSO Party

8 November 2025

by Hiroshi Takahashi VA7LET

How often has an operator said that they would like to participate in a QSO party, but cannot do HF at their QTH? Here is a way they can join us, on 2m! Nov 8th 2025, Saturday, from 10:00-14:00 PST, let's have a Party on 2m, FM, AM, CW, or SSB.

Use an FM simplex frequency between 146.415 and 147.570 MHz, use 144.450 MHz for AM, below 144.200 MHz for CW, or an SSB frequency between 144.200 and 144.275MHz.

Contest is open to all certified amateurs. Each QSO must have one station within Metro Vancouver, Vancouver and Gulf Islands, Southwest BC (Grids CN79, CN89, CN99, and DN09) or Northwest WA (only Grid Squares along the Canada-USA border: CN78, CN88, CN98, DN08) in order to be considered for points.

- Radios will be classified by power as QRP (10w or less), MED (11-49w), HIGH (50w or higher)
- Points will be given for the correct exchange of Callsign, Power class, Municipality.
- Stations may be MOBILE (calling from multiple Municipalities), or FIXED (one Municipality).

Each FM station worked is worth one point. Each CW, SSB, or AM station worked is worth 2 points. A Fixed station may be worked only once in each mode, while a Mobile station may be worked more than once if it has moved to a different Municipality. 10 bonus points for each municipality that you contact. 10 bonus points for each municipality you are transmitting from. (Shhhhhh, your first contact could be worth 22 points (10+10+2 points).



FM Operating Frequencies

146.415	146.430	146.445
146.460	146.475	146.490
146.505	147.570	146.535
146.550	146.565	146.580
146.595	147.420	147.450
147.480	147.510	147.540

SSB Operating Frequencies

144.200 to 144.275 MHz

AM Operating Frequency

144.450 MHz

CW Operating Frequencies

144.00 to 144.200 MHz

Valid FM operating frequencies are shown in the table
(ref: <https://wp.rac.ca/144-mhz-2m-page/>)

Electronic log files are to be submitted in XLS or gsheets format to qsoparty@radioroom.ca by Dec 15, to be included in the scoring. No prizes will be awarded, but lots of admiration from your peers.

For further information, contact
qsoparty@radioroom.ca

Valid Exchange: Callsign, Power class, Municipality

Power Class: QRP (10w or less), MED (11-49w), HIGH (50w or more)

~ Hiroshi VA7LET

Club In Focus



The North American QRP CW Club

by JOHN SCHOUTEN VE7TI

As Editor of The Communicator, I find myself reading many club newsletters, some are OK, some are good and some excellent. It occurred to me that it might be interesting for our readers to experience some of the enjoyment that I have obtained from my armchair travel with various groups. So here is the first:

In the expansive world of amateur radio, where faint signals traverse continents on minimal power, the [North American QRP CW Club](https://www.naqcc.info) (NAQCC) stands as a dedicated hub for enthusiasts of low-power Morse code operations. Established in the early 2000s to promote QRP (5 watts or less) and QRPP (under 1 watt) activities using CW, NAQCC has evolved into a global movement focused on education, experimentation, and emergency communications with simple wire antennas and homebrew equipment.

With over 12,000 members across all 50 U.S. states, 9 Canadian provinces, and 102 countries, this nonprofit organization emphasizes skill and simplicity over high power. This overview is based on the club's website at <https://www.naqcc.info> and the [September 2025 NAQCC News](#) newsletter (Issue 327), a 20-plus-page PDF filled with technical details, event summaries, and member contributions. As of September 11, 2025, NAQCC is marking its 21st anniversary with monthly sprints, challenges, and celebrations that keep CW active and engaging.

The club's structure, activities, newsletter, member experiences, and future outlook, highlight how it makes low-power operations rewarding and accessible. NAQCC's core mission revolves around the

idea that "a little bit of QRP on a wire goes a long way," as stated by President John KK4ITX in the latest newsletter. Founded around 2004 amid a shift toward digital modes and high-power contests, the club aimed to preserve and revive CW skills through dedicated low-power events. Its call sign, N3AQC, reflects a North American base while welcoming worldwide participation.

Membership is free and open to any licensed ham or shortwave listener interested in CW and QRP, requiring only a quick online form. Benefits include access to a 12,000-plus member directory, spotter schedules for planning contacts, and a supportive community. Recent developments include migrating the Challenge App to <http://naqcc.wb5rvz.org>, 24 new members, and profile update reminders. The website is straightforward and mobile-friendly, with sections for awards, challenges, sprints, CW help, and newsletters. It avoids ads and focuses on usability.

For beginners, resources like slow-speed nets (10-15 WPM on 40 meters) ease entry into HF CW, especially for new Technician licensees. The club's activities form a regular schedule of sprints, challenges, and QSO parties to build skills and encourage participation. Monthly two-hour CW Sprints, such as the August 13, 2025, event on 80/40/20 meters, limit power to 5 watts and promote antenna experimentation. That sprint logged 723 QSOs, with comments like Steve N18W's success contacting Colorado stations. Variants include 160-meter and QRPP sprints, while the September 17 event shows

Event Type	Frequency	Duration	Power Limit	Unique Twist
CW Sprints	Monthly	2 hours	5W	Weeknight scheduling for accessibility
Challenges	Monthly	1 month	QRP/QRPp	Themed word hunts from call signs
QSO Parties	Varies (state-aligned)	1-2 days	QRP	Ties into broader ham events
Anniversary Ops	Annual	1 week	QRP	Regional N3A calls, volunteer-driven

the club's flexible approach. Monthly Challenges add creativity; September's "Versabar VB-10000" involves forming words from call signs linked to a salvage ship, with trackers and certificates. August's "Explosives" theme drew over 100 participants.

QSO Parties tie into state events (e.g., Tennessee, Texas in September), supporting the State QSO Party Challenge. Awards recognize achievements like consistent activity (Iron Man) or band-specific milestones, based on logged QSOs. The 21st Anniversary Celebration (October 11-18, 2025) featured regional N3A calls (e.g., N3A/4), band rules, and volunteer sprints.

Events like the Flight of the Bumble Bees (September 21) use N3AQC for themed contacts. Local chapters, such as the Long Island group's POTA activation at Belmont Lake State Park with four stations, build in-person ties.

On X (@NorthQrp), sprint reminders get engagement, and Reddit users credit sprints for improving perseverance, with one progressing from four to many QSOs. [eHam.net](https://www.eham.net) reviews note 80-meter sprints reaching 29 states on battery power. These events cater to all levels, emphasizing fun and learning.

The NAQCC News newsletter serves as the club's central communication tool, delivered monthly as a PDF to maintain a traditional feel. Issue 327 (September 2025) spans 24 pages in low-resolution for easy distribution, with a call for more member articles. Key sections include: "The Prez Sez," covering John KK4ITX's updates on summer, travel, VP vacancy, and new members like KJ5MHU; technical pieces, such as Dean N2TNN's guide to building a 9:1 unun for random wires, achieving 1.2:1 SWR on 80-10 meters and effective in POTA; event recaps by Gary K1YAN (Versabar challenge); club news with net reports (East Texas: 15 check-

ins), sprint stats (195 QSOs on 20 meters in August), awards (Don VE3DQN's plaque), and chapter highlights (Long Island activation by Ed N2GSL); and "Soapbox" for stories, polls, and gear swaps, linked to X posts like [@theAF5D](https://twitter.com/theAF5D)'s keyer modification. The tone is friendly and humorous, with archives showing growth from early small sprints to today's 700-plus QSO events. X posts about releases gain 3-15 likes, and operators like [@wa1gov](https://twitter.com/wa1gov) share content.

The PDF format limits searching but suits low-bandwidth users. Archives provide historical context, and the newsletter binds the membership through shared content. Member feedback across platforms underscores NAQCC's value. QRZ forums (2019) highlight sprints gathering QRP CW operators on 3560 kHz despite noise. eHam praises weeknight 80-meter sprints for accessibility. Reddit posts describe skill gains in timing and instincts, turning initial difficulties into Field Day successes, with 2024 comments calling QRP "loads of fun" in NAQCC events. X users like [@N5BO_Justin](https://twitter.com/N5BO_Justin) (115 QSOs in a related event) and [@dirtyolefireman](https://twitter.com/dirtyolefireman) (POTA boosts from challenges) show real-time enthusiasm. DX contacts, such as JR2IUB on 20 meters, confirm global appeal. Benefits include faster CW speeds (10-20 WPM via nets) and emergency readiness with basic antennas per FCC rules.

Growth challenges include volunteer demands and budget needs met by donations, but the free model keeps it open to all. NAQCC proves low-power CW can create strong connections, from local park activations to contacts in Fiji. Over 21 years, it has upheld ham radio principles of curiosity and craftsmanship. Anyone can join for free, and make their first QRP contact. The club rates highly for its focused mission and community spirit.

73,

~ John VE7TI

There is a club video at <https://youtu.be/WPRPJEGpw9w>

Simple QRP 9:1 Unun Construction

by DEAN MARZOCCA N2TNN



Dean N2TNN is an avid CW and FT-8 QRP operator. He lives in Virginia.

This article is reprinted with permission from the NAQCC News, issue 327 - September 2025

The NORTH AMERICAN QRP CW CLUB website is at: <http://www.naqcc.info>

One of the great joys of QRP operation is heading outdoors and making radio contacts in the field. Parks on the Air (POTA) offers an ideal opportunity to do this every day. Over the past year, I have been actively participating in POTA, taking pleasure in the challenge of assembling the perfect portable station. The key to success, time and again, is the antenna. While rigs matter, nothing is as crucial as a highly efficient, low-loss portable antenna—especially when operating with just five watts.

The Search for the Ideal Antenna

My antenna of choice has been the End Fed Half Wave (EFHW), constructed with a 49:1 unun and approximately 33 feet of wire. This setup is convenient and easy to deploy due to its short length, but it comes with the drawback of limited band coverage. Fortunately, being part of a local club brimming with knowledgeable members, a conversation began about using

random length wires. Random wires generally have lower impedance than EFHWs, necessitating a new unun design.

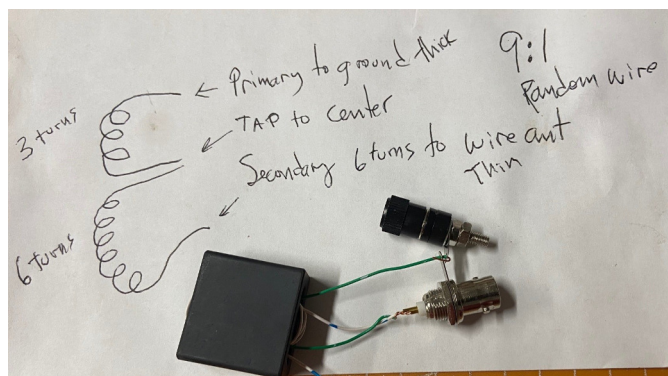
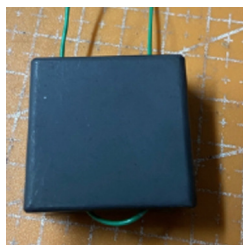
Designing the 9:1 Unun

There are numerous 9:1 unun designs available online, many using round cores like the T-240. However, T-240 cores can be bulky for portable setups, so I sought something more compact. I came across a drawing of a 9:1 unun using a binocular core. Turning to club expertise, the [BN-61-002](#) core was recommended for its suitable material properties and ready availability. Once in hand, I began winding the core.



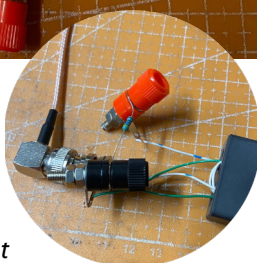
Construction and Testing

To simplify identifying the primary and secondary windings, I used two different wire colours—white for the primary and green for the secondary.



For connectors, I used a BNC for coaxial input and two versatile wire connectors that accommodate either

solid wire or a butt connector for the radial and long wire.



With the test model built, I used a 467-ohm resistor to mimic a random wire and performed a sweep with an antenna analyzer. The SWR reading was 1.2 across all bands from 80 to 10 meters, indicating a highly effective 9:1 unun for random wire antennas.

The primary consists of three complete turns, with each turn passing through both holes of the core. Leave the starting wire unstripped and strip only the end after three turns to mark your progress.

The secondary is a continuous loop of six additional turns in the same direction, with appropriate stripping and twisting as described.

Final Build and Deployment

My first build kept the wires as short as possible, encasing the core and connectors in hot glue, with a zip tie as a hanging strap. The wire length was exactly 85 feet, with a loop at the end for easy hanging.

A crucial element is the counterpoise system. I started with a 17-foot wire, later adding a 34-foot wire, both connected at the ground terminal (black). The random wire attaches to the (red) wire connector.

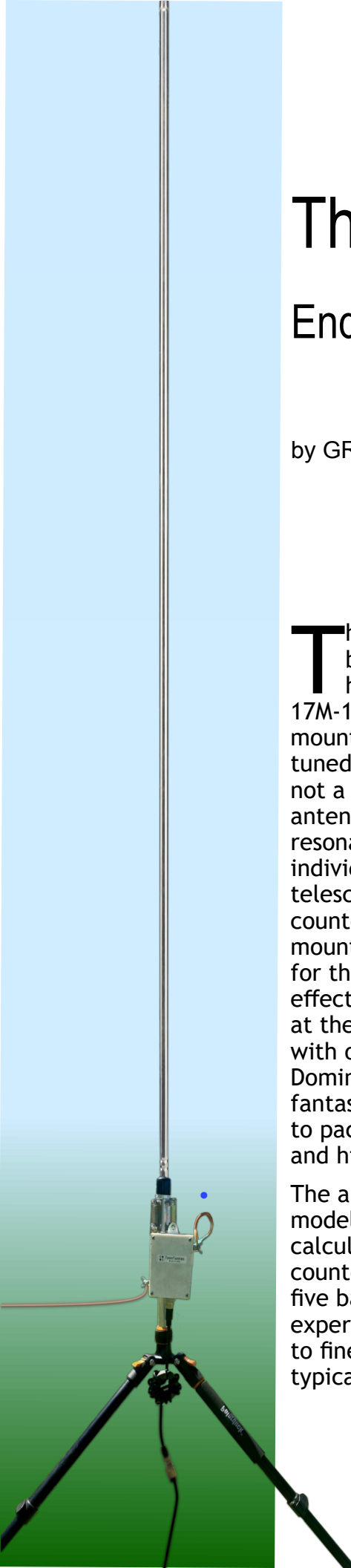
On-Air Results and Flexibility

With this setup, operating is straightforward and requires minimal equipment. The 85-foot wire successfully loads from 80 meters through 6 meters with little rig tuning. Of course, other wire lengths can be chosen; consult random wire antenna resources to select the best length for your preferred bands.

This approach has consistently delivered results for me, often resulting in exciting pileups during POTA activations. Special thanks to our Engineer Mark N1LO and Professor Danny KW4LQ—technical discussions are never in short supply at our lunch meetings.

~ Dean N2TNN

Note: Dean shows a 1.2:1 SWR going into a ~450 ohm load, which is good, but going into a wire instead of a resistor you'll need a tuner in front of it because the antenna won't be resonant on any ham frequencies. That's the tradeoff with the random vs half-wave antennas, which are resonant on a limited set of frequencies without a tuner. - Brent WT4U



The Dominator

End-Fed Halfwave Antenna by KJ6ER

by GREG MIHRAN KJ6ER

The Dominator is a resonant one-band-at-a-time elevated halfwave vertical antenna for 17M-10M sitting on a tripod or PVC mount. This antenna requires a tuned, linked counterpoise. This is not a typical multiband EFHW antenna because it is halfwave resonant on each of the five bands individually by adjusting the telescoping whip and linked counterpoise to resonance. The mount provides an elevated feedpoint for the unun to alleviate ground effects and delivers peak RF current at the midpoint of the radiating whip with over 90% efficiency (on the Dominator+ version). This is a fantastic low angle, DX antenna - easy to pack, fast to deploy, very effective and highly efficient!

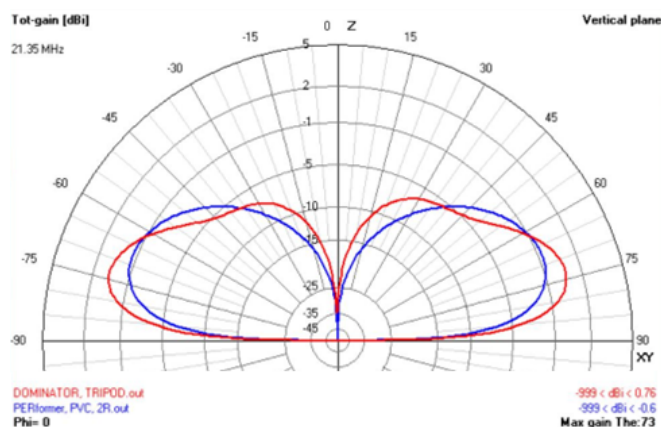
The antenna has been computer modeled extensively in 4NEC2 which calculated optimal whip and counterpoise lengths for each of the five bands. You will have to experiment in your own surroundings to finetune these, but <1.10:1 SWR is typical on 17M-10M.

Why an End-Fed (EF) Halfwave Vertical Antenna

During the peak years of a solar cycle, DX propagation is more available during longer periods of the UTC Day. There are three key advantages of a halfwave over a quarterwave vertical antenna:

1. Transmits with a lower angle of radiation for greater DX potential (5-20 degrees).
2. Provides up to 2x more gain (+3dB) of radiated signals.
3. Does not require an antenna tuner or multiple radials for faster deployment.

On the diagram *[next page]* note the far-field radiation patterns of the halfwave vertical *[red]* overlayed with a typical quarterwave vertical antenna *[blue]*. Not only does the halfwave provide more gain but it has a lower angle of maximum radiation (takeoff angle) between 16-18 degrees versus a typical quarterwave radiation peak between 25-30 degrees. The disadvantages of a halfwave antenna are that it uses



almost twice the length of radiating element over a quarterwave antenna requiring good stability, and it requires a high impedance matching system for traditional 50-ohm coax. However, both these disadvantages are easily overcome.

Antenna System Parts List with Prices and Links (as of September 2025)

The Dominator EF halfwave antenna was designed to leverage many components hams typically already have on hand. If not available in your ham radio stuff box, here are some components recommended for the antenna system (substitute as desired):

- Chameleon™ CHA SS25 25' telescoping whip (\$100) for 17M-10M, or alternatively for 12M-10M only: Chameleon™ CHA SS17 17' telescoping whip (\$70) - chameleonantenna.com/products/stainless-steel-whip
- MACTREM™ 67" tripod (\$50) - amazon.com/dp/B0CDKFJLX7
- Pro Trucker™ Mirror mount with 3/8x24 to SO-239 stud, replace SO-239 with a 3/8x24 bolt (\$13) - amazon.com/dp/B01G2QSNDG or alternatively, FireStik™ K4 Antenna Sud Mount to be inserted in an existing mirror mount (\$11) - amazon.com/dp/B000X380KQ
- TennTennas™ 49:1 Transformer for the Dominator (\$46) - www.ebay.com/sch/i.html?&_nkw=tenntennas or alternatively,

- MyAntennas™ MEF-130-LP 56:1 higher performance Transformer for the Dominator+ (\$89) - myantennas.com/wp/product/mef-130-lp/

- Palomar Engineers™ RF Feedline Choke (\$30) for the Dominator - palomar-engineers.com/antenna-products/Coax-Jumper-Choke-RG-8X-RFI-Range-1-8-65-MHz-30-dB-Noise-Reduction-1-5KW-PEP-Magnetic-Loop-Antenna-Choke-p159344870 or alternatively



- Palomar Engineers™ low insertion loss RF Feedline Choke (\$70) for the Dominator+ - palomar-engineers.com/antenna-products/baluns-and-ununs/1-8-30-mhz-balunsununs/11-toroid-baluns/MINI-CHOKER-Coax-Line-Isolator-500-Watts-PEP-up-to-38Db-Common-Mode-Rejection-1-61-MHz-1-1-Unun-p144638185



- BNTECHGO Yellow 14 AWG radiator pigtail (\$14 for 25' spool) - amazon.com/dp/B06XDL41PS. BNTECHGO Orange 18 AWG counterpoise (\$18 for 100' spool) - amazon.com/dp/B01MPZJOYN

Traditional Calculations, 4NEC2 Model Computations and Field Measurements

Below are the traditional calculations and 4NEC2 computer model half wavelength computations for the 17M-10M bands. The traditional $468 / f$ calculation is assumed to be in perfect free space and is a good starting point for any antenna, even though it returns results that are typically too long.

The 4NEC2 computer model represents the Dominator antenna in the virtual world by attempting to map current flows, component velocity factors, radiator end effects and ground interaction. As can be seen in the table below, it is reasonably close or a bit longer than the traditional calculation.

However, the most relevant results are the field measurements made in the real world. These factor everything in and around the

Traditional Calculations				Computer Model					Field Measurements				
Band	Target Freq. (MHz)	468 / f		Radiator		Counterpoise			Radiator		Counterpoise		
		Length	Inches	Inches	λ %	Inches	Incr. Seg.	λ %	Inches	λ	Inches	Incr. Seg.	λ
17M	18.140	25' 10"	310	315	50.8%	206	31	33.3%	278	44.9%	206	31	33.3%
15M	21.350	21' 11"	263	272	51.8%	175	25	33.3%	228	43.3%	175	25	33.3%
12M	24.940	18' 9"	225	233	51.7%	150	18	33.3%	199	44.2%	150	18	33.3%
10M	28.400	16' 6"	198	204	51.7%	132	132	33.4%	177	44.8%	132	132	33.4%

antenna system including the configuration and interaction of all various components, imperfect and variable ground conditions and near-field surroundings. As many say, when it comes to antennas, “everything affects everything”.

Do not be surprised if your Dominator antenna ultimately requires a slightly different radiator and/or linked counterpoise length due to your specific environment. Some experimentation will initially need to be performed. Practice deploying the antenna in your own backyard first before you take the antenna out to the field. An elevated feedpoint anywhere between 12-48 inches is fine due to the low current at this near-end point in the radiator. When you lower the feedpoint, it also lays more counterpoise directly on the ground which may help impedance matching. Given the very low current in the counterpoise, it has a negligible impact on radiation and efficiency.

Field experiments and measurements ultimately revealed the radiator lengths can be reduced even further from the model. Many dozens of hours in the field were spent testing various combinations of radiator and counterpoise lengths. However, by extending a 33% λ counterpoise for the band of operation, the radiator was reduced to an average of 44% λ for that band. This discovery allowed the 25' whip to fully cover four bands, 17M-10M. The 17' whip covers

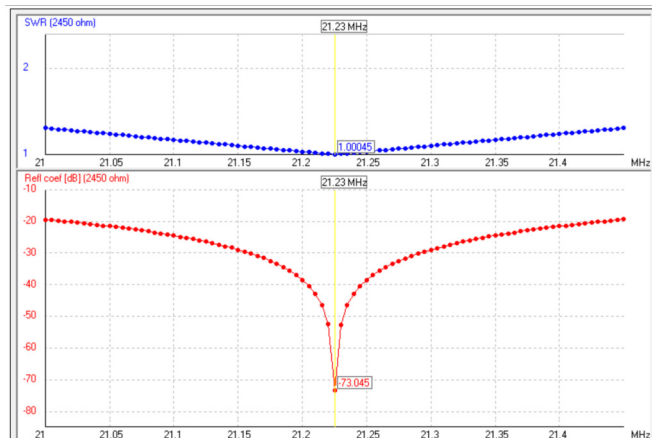
two bands, 12M-10M. (Later on in the document, a 20M hack is shared if you want to experiment).

Even though the antenna leverages a 49:1 or 56:1 transformer to compensate for high impedance at the radiator end, it also uses the extended length of the counterpoise to provide a reliable return path for RF currents and impedance matching. A separate counterpoise wire is imperative for optimal antenna efficiency and radiation.

The **tuned, linked counterpoise** wire ensures a predictable and highly efficient halfwave radiation pattern. For this reason, never use the coax shield as the counterpoise. To ensure this, the Dominator includes an RF choke at the feedpoint to prevent the coax from becoming a second counterpoise - never operate without an RF choke!

Traditional Calculations, 4NEC Computer Model and Field Measurements for the 17M-10M Bands.

4NEC2 Computer Model Graphics Showing the SWR Band Sweep and Reflection Coefficient for 15M at the center of the band, 21.225 MHz, where the SWR is computed to be 1.00:1. As confirmed through field testing, note the very broadband characteristics of the SWR sweep. At the band edges, the SWR is 1.24:1 at 21.000 MHz, and also 1.24:1 at 21.450 MHz. Thus, the entire band is under



1.50:1 and does not require an external tuner. The reflection coefficient is -73 dB at the center of the band which is excellent for high radiation efficiency.

A Simplified Picture of the Dominator Halfwave Vertical Antenna System

The telescoping whip is the primary halfwave radiator screwed into the mirror mount which is attached to the tripod tube. The TennTennas™ 49:1 transformer is attached to the mirror mount using one of its four bolts. There is a 12" wire pigtail (orange 14-gauge) attached to the positive wing nut and a 6" wire pigtail (yellow 18-gauge) attached to the transformer negative wing nut. Make

sure the whip is isolated from mirror mount and tripod by using non-conductive washers or gaskets. Additionally, make sure the wire from the transformer positive to the base of the whip is also isolated from the mirror mount.

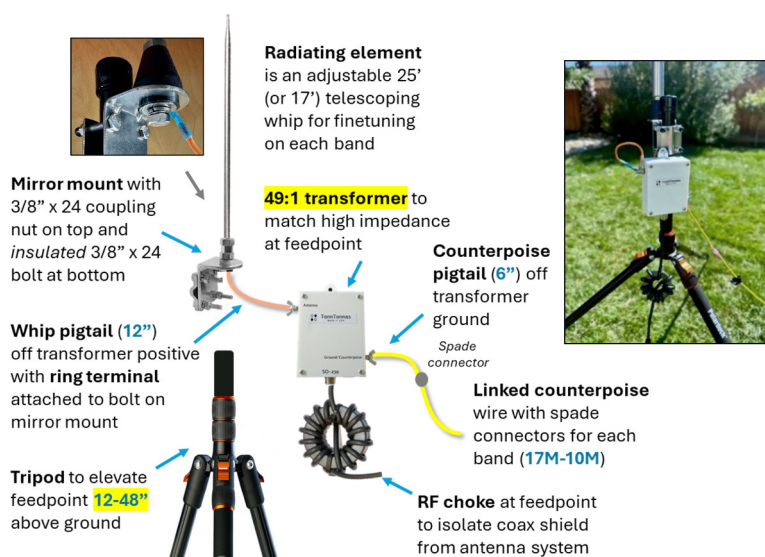
The 12" wire whip pigtail connects from a bolt at the base of the mirror mount to the transformer wing nut. A 6" wire counterpoise pigtail connects the transformer ground to the linked counterpoise wire with a spade connector. This allows quick extension of the counterpoise band segments.

The elevated feedpoint at the top of the tripod helps alleviate ground distortion of the halfwave resonance and radiation pattern. The required RF choke at the transformer SO-239 input connector isolates the coax shield from the antenna system preventing it from becoming a second counterpoise.

Never use the coax shield as a counterpoise for the Dominator antenna. The linked counterpoise wire off the transformer ground terminal should be the only counterpoise used for this antenna.

Telescoping Whip Radiator and Counterpoise Lengths

To allow the antenna to resonate as a halfwave on 4 bands one-band-at-a-time with the 25' telescoping whip, there is a 12" pigtail off the transformer positive connecting it to the base of the whip for 17M-10M. This also extends the whip length one foot longer. The whip pigtail does not carry a lot of current (at this point in the radiator) so the radiation pattern is not impacted. There is 20M hack later in this document which extends the pigtail for that band. When using the 17' whip, the same 12" pigtail provides coverage for 12M-10M only.



Configuring the Telescoping Whip and Counterpoise for Each Band.

25' Chameleon Whip								
Band	Target Freq. (MHz)	Radiator				Counterpoise		
		Whip Pigtail	Whip Length	Whip Config.	Total Length	CP Pigtail	Incremental CP Segment	Total Length
17M	18.140	1' 0"	22' 2"	11 sec + 11"	23' 2"	---	2' 7"	17' 2"
15M	21.350	1' 0"	18' 0"	9 sec + 9"	19' 0"	---	2' 1"	14' 7"
12M	24.940	1' 0"	15' 7"	7 sec + 16"	16' 7"	---	1' 6"	12' 6"
10M	28.400	1' 0"	13' 9"	6 sec + 15"	14' 9"	6"	10' 6"	11' 0"

17' Chameleon Whip								
Band	Target Freq. (MHz)	Radiator				Counterpoise		
		Whip Pigtail	Whip Length	Whip Config.	Total Length	CP Pigtail	Incremental CP Segment	Total Length
12M	24.940	1' 0"	15' 7"	8 sec + 3"	16' 7"	---	1' 6"	12' 6"
10M	28.400	1' 0"	13' 9"	7 sec + 0"	14' 9"	6"	10' 6"	11' 0"

In the charts above, the Total Radiator Length is equal to the 12" Whip Pigtail off the transformer positive plus the adjusted Whip Length. The Whip Configuration shows approximately how many sections above the base section are exposed.

For example, to operate on 12M, extend the 25' whip 7 sections plus 16" of the next section from the top to begin measuring SWR. Or if using the 17' whip, extend it 8 sections plus 3" of the next section. As mentioned, **every installation will vary depending on the ground type and near-field surroundings**. Use your antenna analyzer to adjust the whip to resonance of the band you would like to operate on.

The Total Counterpoise (CP) length is equal to the transformer ground 6" Counterpoise Pigtail plus an Incremental Counterpoise Wire Segment to optimize the counterpoise for that band. The incremental segment is attached via spade connector to the previous segment. This counterpoise wire drops down from the transformer at roughly a 30-45-degree angle and then runs along the ground perpendicular to the telescoping whip. It is advisable to keep the counterpoise away from the coax, ideally perpendicular.

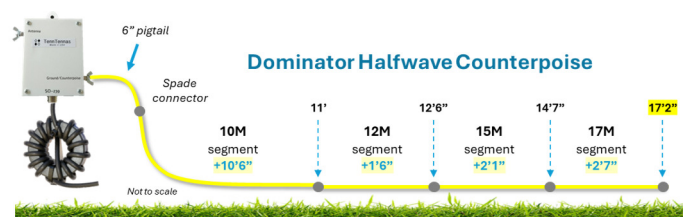
Linked Counterpoise Wire using the TennTennas™ 49:1 Transformer

Through modeling and experimentation, I discovered there are three important keys that make the Dominator a very effective and efficient halfwave antenna:

1. **Elevating the transformer and feedpoint** off the ground by at least 12" to alleviate ground effects that distort the low angle radiation pattern and transmitted energy. This requires a good tripod with a broad footprint to provide physical stability.
2. **Inserting an RF choke at the feedpoint** to isolate the coax from the antenna system to prevent common mode currents (CMC) and radio frequency interference (RFI). Using the coax as a counterpoise could also lead to unpredictable radiation and high SWR.
3. **Attaching a linked counterpoise wire** which works in conjunction with the telescoping whip for low SWR at resonance. Use the whip as your tuning variable, the counterpoise length is constant.

Field testing indicated that a counterpoise of roughly a third wavelength performed exceptionally well with the whip for the single band of operation. The longer counterpoise wire lowers the overall antenna system resonance slightly which facilitates a shorter length of whip. This radiator/counterpoise combination allows the 25' whip to resonate within the 17M-10M bands.

If you plan to use the TennTennas™ 49:1 transformer, you should cut your counterpoise wires as shown below. If you use a different transformer, the counterpoise lengths will likely differ. Start with the 6" pigtail with the 10M segment first. When you determine the appropriate length required



for resonance on 10M, cut the next 12M segment, and so on. Once you cut these lengths, do not change them, they should remain constant. Use the 25' or 17' telescoping whip as your tuning variable in the field for minimum SWR.

Operating on 20M with the 25' Telescoping Whip – The Hack

There is a simple hack to resonate close to the 20M band with the 25' whip. While it does not resonate within the band, it is close enough due to the wide bandwidth characteristics of the antenna. Simply cut the 12" whip pigtail in half and attach spade connectors. Create an 18" wire segment to extend the whip pigtail to a total of 2' 6". Also cut a 36" wire segment to extend the counterpoise to 20' 2". This radiator / counterpoise combination typically resonates around 15 MHz $\pm$ 150 kHz but operation is possible even with an SWR of 1.50:1 or higher without a tuner.

Higher Efficiency with a MyAntennas™ 56:1 Transformer

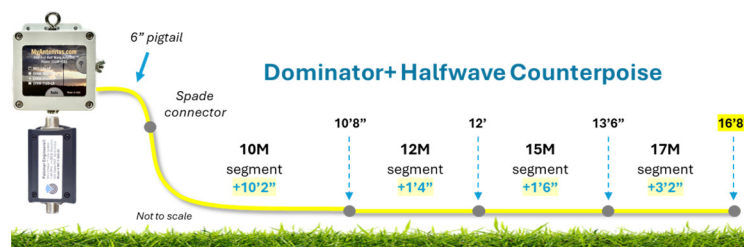
A typical 49:1 transformer is not the most efficient component. While the TennTennas™ is well-made, it does have an insertion loss of -0.96 dB which equates to 80.1%

Dominator TennTennas 49:1 Transformer	Dominator+ MyAntennas 56:1 MEF-130-LP Transformer
	
Power Range: 100 watts Bandwidth: 1.8-30 MHz	Power Range: 250 watts Bandwidth: 1.8-30 MHz
Insertion Loss: -0.96 dB Efficiency: 80.1%	Insertion Loss: -0.40 dB Efficiency: 91.2%
Palomar JC-1-1500	Palomar MC-1-500-50
	
Power Range: 1,500 watts Noise Reduction: -32 dB Bandwidth: 1.8-65 MHz	Power Range: 500 watts Noise Reduction: -42 dB Bandwidth: 1-60 MHz
FT-240-31 Toroid	Ferrite Bead Mix 31
-1.08 dB	-0.51 dB

efficiency. If you want to increase the overall efficiency and bandwidth, exchange it with a MyAntennas™ 56:1 transformer with only -0.40 dB insertion loss, or 91.2% efficiency. It can be paired with a more efficient RF Choke, Palomar™ MC-1-500-50, which has an insertion loss of -0.11 dB, or 97.4% efficiency. This is the Dominator+ and the version of the antenna I prefer and use exclusively.

Linked Counterpoise Wire for the Dominator+

If you use the MyAntennas™ 56:1 for the Dominator+ higher efficiency halfwave, the counterpoise lengths will be slightly shorter than the 49:1 transformer. This 56:1 unun is looking for a 2,800 Ω impedance match ($56 \times 50\Omega$) which is further down the radiator and, hence, slightly less counterpoise wire is required. This transformer does not have a ground terminal, so connect the 6" pigtail to one of the SO-239 screws at the bottom using a ring terminal on the 18-gauge wire. Pair it up with the Palomar™ higher efficiency RF choke for optimal performance.



Mounting the Telescoping Whip and Transformer to the Tripod

What makes the Dominator halfwave antenna so easy to pack and deploy is that both the telescoping whip base and the transformer are already mounted on the tripod.

Using one of the two lower bolts on the mirror mount, use another long bolt and spacer to keep the transformer slightly away from the tripod upper tube. Secure it tightly



so that it does not move easily. Keep both the 12" whip pigtail and the 6" counterpoise pigtail attached to the transformer.

Once you are in the field, you will just need to extend and spread the tripod legs so that the antenna is physically stable and then attach the telescoping whip and counterpoise wire segment for the band.

A very stable tripod is especially important when using the Chameleon™ 25' telescoping whip due to its longer extension over the 17' whip. It can very easily topple over and damage the whip with unexpected wind gusts.

Spread and extend the tripod legs so that the feedpoint is anywhere from 1'-4' above ground level. There is little current at the feedpoint at this low point in the radiator so a lower feedpoint is fine. With the MACTREM™ tripod, there is no center plate to limit the leg spread so it can be very stable with a wide span. The legs should be fully extended to 53" each, and the angle between them is variable (it even lays close to flat for extra windy conditions). But never operate the antenna with the feedpoint less than 12" off the ground.



In case there is some excessive wind when the whip is extended, it is also possible to secure an 8" garden staple on each leg to buckle it to the ground. Insert these at a perpendicular angle near the base of the leg into the ground.

Alternatively, use the built-in hook at the base of the upper tripod telescoping tube with a weight or bungee cord secured to the ground

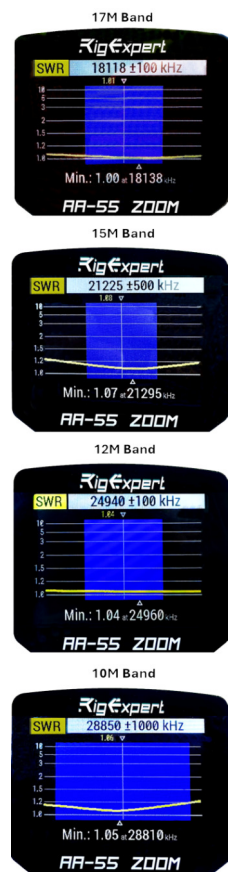
with one of these garden staples. Either way, your tripod will be reasonably secure in windy conditions with a lower center of gravity while only the whip will be waving in the breeze.

Finetuning the Antenna in the Field

You can easily and quickly finetune the Dominator halfwave antenna to resonance with an antenna analyzer by adjusting the length of the whip once the linked counterpoise is laid out on the ground. Since every portable deployment will have different ground types and near-field surroundings, remember generally where to extend the whip initially for a particular band (e.g. number of sections extended and inches into the next section) and then make whip adjustments from there.

In some environments, it may be tough to get the SWR you want. Remember, any SWR at or below 1.50:1 is fine - your antenna is 96% efficient with that SWR! But if you are having trouble, try reducing the elevation of the feedpoint by shortening the tripod legs or increasing their span. This will lower the feedpoint as well as lay more counterpoise on the ground which may help tune the antenna. This is fine even if the droop angle off the unun ground terminal is 30° or less. Because of the resonant characteristics and broad bandwidth of the Dominator, you should not require an external antenna tuner at your rig or at the antenna base, reducing any potential insertion losses caused by these components and saving on packing.

Field SWR Measurements of the Antenna for each band are shown. The broad bandwidth of the Dominator halfwave antenna



allows you to operate across the entire 10M band including the AM/FM/Repeater portions above 29 MHz. The antenna is also <1.10 SWR across the 12M, 15M, and 17M bands.

Packing the Antenna and Its Components

Not only is the Dominator antenna a very effective and efficient one-band-at-a-time halfwave antenna, but it is also very lightweight and compact to carry for portable operations. The entire antenna system is made up of 4 components: telescoping whip, tripod/transformer assembly, accessories bag for the linked counterpoise and, of course, a RigExpert™ Stick analyzer.

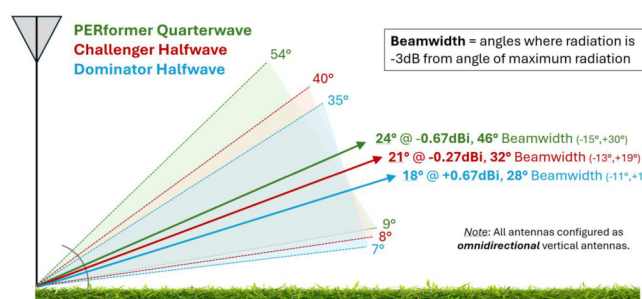


Comparing the PERformer Quarterwave, Challenger Halfwave and Dominator Halfwave Antennas

I designed three portable vertical antennas because each has their own best use case. The PERformer quarterwave is optimal for regional to continental coverage, the Challenger off center-fed halfwave is optimal for continental to global coverage, while the Dominator end-fed halfwave vertical is optimal for cross-continental and global DX coverage. All antennas provide high structural antenna efficiency.

The graphic demonstrates how unique each of the antennas are in these characteristics. The Challenger peak radiation of -0.27 dBi is at an angle 3° lower than the PERformer, while the Dominator peak radiation of +0.67 dBi is at an angle 3° lower than the Challenger. Among all

Specifications	PERformer	Challenger	Dominator
Vertical Wavelength	• Quarterwave	• Halfwave	• Halfwave
Antenna Configuration	• Omni/Directional • 2 Elevated Tuned Linked Radials 90/180° apart	• Omnidirectional • 1 Linked Counterpoise, ~10% λ per band	• Omnidirectional • 1 Linked Counterpoise, ~33% λ per band
Band Coverage	• 40M-6M	• 20M-6M	• 17M-10M
Structural Efficiency	• 90.8%	• 94.3%	• 99.5%
50Ω Impedance Match	• ---	• 4:1 Unun Off-Center Fed	• 49/56:1 Xformer End-Fed
Key Component Loss	• -0.12 dB (toroid choke only)	• -0.46 to -0.35 dB	• -1.08 to -0.51 dB
Peak Radiation	• -0.67 dBi / +0.41 dBi	• -0.27 dBi	• +0.67 dBi
Angle of Peak Radiation (-3 dB BW)	• 24° (9° to 54°)	• 21° (8° to 40°)	• 18° (7° to 35°)
-3.00 dB Beamwidth	• 46° (-15°, +30°)	• 32° (-13°, +19°)	• 28° (-11°, +17°)
Primary Reach	• Regional, Continental	• Continental, Global	• Global



three antennas, the Dominator has the lowest angle of maximum radiation (takeoff angle), averaging 18° across the bands, and will perform well for low angle global DX communications when conditions are right.

The Dominator is a global DX-ready halfwave vertical antenna for 17M-10M and I strongly encourage you to try it in the field. As with my PERformer quarterwave and Challenger halfwave vertical antennas, this antenna deploys very fast. I can get the Dominator up and running with the linked counterpoise wire in a couple minutes. And when it is time to leave, the antenna is fast and easy to pack up.

Please let me know if you have any questions, I'd be happy to help, 73! 😊

~ Greg Mihran, KJ6ER
Campbell, California
greg@kj6er.net

For additional information on this, and other KJ6ER antennas, please visit www.qrz.com/db/KJ6ER



From the POTA Activator's Toolbox:

The POTA PERformer vertical antenna revisited

by DMITRY SEVOSTIANOV VA7DVO



Dmitry VA7DVO is a graduate of our SARC Basic course and an active club member. He is very active with POTA and has recently delved into CW as a mode.

POTA is by far my favorite part of the amateur radio hobby. I enjoy portable operations from beautiful parks and forests, and I'm always on the lookout for compact, well-performing antennas that are quick and easy to deploy. A few years ago, I purchased a JPC-12 vertical antenna with a telescopic whip and loading coil. This resonant multi-band antenna covers 10 m through 40 m, is compact and lightweight, and comes in a handy carry case. In stock form, it's quick to set up, and I made plenty of successful contacts on SSB and digital modes while activating several parks.

Over time, I made a few improvements. First, I added a 5.6 m telescopic whip, which allows me to operate on 20m without the loading coil. Next, I upgraded the ground system by using a round grounding plate and eight thicker-gauge radials, each about 3 meters long. Finally, I installed an RF choke at the feed point to stop RF from traveling up the coax and interfering with my computer during digital operations. With these upgrades, performance noticeably improved. On 20 m, I now get close to a 1:1 SWR, fine-tuned by adjusting whip length. Running 50 watts CW, I've had coast-to-coast coverage and even logged some DX. Best of all, deployment still takes less than five minutes.

The JPC-12 remains a solid antenna, widely available on AliExpress or Amazon for around \$190 CAD (shipping included). The 5.6 m whip costs about \$20, and the grounding plate about \$28 CAD. But I'm always on the hunt for better performance—and one day I came across the **POTA PERformer antenna**, developed by Greg Mihran, KJ6ER. Greg's full presentation can be found here: <https://bit.ly/KJ6ERPERformer>, and he also wrote about it in the [September-October 2025 issue of The Communicator](#).



Greg's design immediately impressed me. He dives deep into the science, but here I'll focus on the practical side: building and using the antenna in the field.

What Is the POTA PERformer?

As Greg explains, the POTA PERformer (Portable, Elevated, Resonant) is a resonant, single-band-at-a-time elevated quarter-wave vertical antenna for 40 m through 6 m. The design rests on two key principles:

1. **Elevated Feed Point** - placed about 52 inches above ground.
2. **Elevated Radials** - two tuned radials, suspended above ground, positioned either 90° or 180° apart.

The radials are made from pre-cut wire segments connected with spade terminals. Frequency adjustment is achieved by adding or removing non-conductive spacers to vary radial length. Final fine-tuning is done by adjusting the telescopic whip.

Greg's modeling and field work demonstrate that this configuration achieves more than 90% efficiency—a massive improvement over typical ground-mounted verticals. In real terms, if you feed the antenna with 100 watts, over 90 watts are radiated. By comparison, a conventional ground-mounted quarter-wave vertical with four radials often achieves only about 37% efficiency.

When the radials are set 90° apart, the antenna shows modest gain (0.3-0.5 dBi) and slight directionality, with a 3-4 dB front-to-back ratio. If an omnidirectional pattern is preferred, the radials can instead be arranged 180° apart.

One critical requirement is a high-quality RF choke at the feed point. Without it, the coax can act as a third radial, causing common-mode currents, RFI, skewed radiation patterns, and unstable SWR.

With efficiency over 90%, Greg's design is remarkable. Naturally, I knew I had to build a POTA PERformer of my own. What follows is my experience converting a JPC-12 into a true POTA PERformer—and how you can build one from scratch if you don't already own a JPC-12.

Converting the JPC-12 into a POTA PERformer

The JPC-12 shares many similarities with the POTA PERformer, so only a few modifications are needed. Here's a quick overview of the original JPC-12 structure, from top to bottom:

- **Telescopic Whip:** adjustable telescopic whip at the top for fine-tuning.
- **Loading coil:** mounted below the whip, with a sliding contact for tuning (can be omitted on 20 m and shorter waves if using a 5.6 m whip).
- **Radiating rods:** four metal rods connected below the coil, forming the vertical element.
- **Feed point:** attached to ground radials spread across the surface.
- **Ground spike:** inserted into the soil for support.



All hardware uses standard M10 × 1.5 mm threads.

For the PERformer conversion, I rearranged components as follows:

- The whip remains at the top. Again, the coil is included only when operating on 40 m.
- The feed point is mounted on a newly designed 3D-printed Insulator assembly, which electrically isolates it from ground.
- The original rods are now purely structural, used to elevate the feed point about 52 inches off the ground.
- The insulator is a core of the conversion. It integrates mounting points for radials, a guy ring for stability, and a cable winder for tidy transport of radial wires.

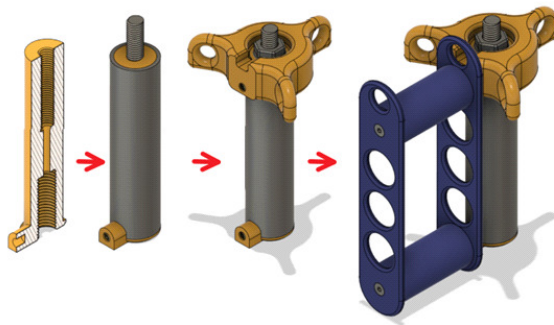


I'll cover the insulator and radial system in detail below, along with the parts list, build process, and optional modifications.

Insulator Design

The **insulator** is at the core of my POTA PERformer antenna design. It is built around a 3D-printed plastic tube with two threaded connections:

- **Top hole:** M10-1.5 thread, accepts a 60 mm threaded rod. This secures the feed point, holds the guy ring in place, and provides an attachment point for radial wires via a ring terminal.
- **Bottom hole:** M14-2 thread, fitted with an M14-to-M10 insert to attach the Insulator to the antenna's support rod.



The insulator also incorporates:

- **Guy ring:** to anchor guy wires in windy conditions.
- **Cable management guides:** to keep radials neatly wound during transport.

This combination makes the Insulator the true “hub” of the PERformer design.



Parts Required

Here are the hardware items I purchased:

1. Ring terminal - [Amazon link](#)
2. Spade connector - [Amazon link](#)
3. Flat M10 hex nut - [AliExpress link](#)
4. Stainless steel flat washer M10 × 20 × 1.2 - [AliExpress link](#)
5. M10 × 60 mm threaded rod - [AliExpress link](#)
6. Aluminum tube OD 29 × ID 25 mm, 300 mm - [AliExpress link](#)
7. 2 × M4 × 70 mm flat-head screws - [Amazon link](#)
8. 2 × M4 × 6 mm brass threaded inserts - [AliExpress link](#)
9. Stainless threaded insert M14-2 to M10-1.5 × 20 mm - [AliExpress link](#)
10. Heat shrink tubing (not pictured)
11. 16 AWG yellow silicone wire - [AliExpress link](#)
12. 2 x Fiberglass Driveway Markers for radial supports [Amazon link](#)
13. 2 x Aluminum Tent Spikes for radial supports [CanadianTire link](#)
14. 3 x Tent Spikes for guy wires [Amazon link](#)
15. 3 x Ratcheting Tent Wires (4m, orange) for Guy wires. [AliExpress link](#)

Left, the hardware required.

Right, the 3D printed parts.



3D-printed parts

I printed all parts using PLA, as it is easy to work with, and the antenna will not be left outside all the time, so heat and UV exposure is not a big concern [illustrations on the previous page].

16. 2x Cable Manager.stl

17. 2x Spacer.stl

18. Guy Ring.stl

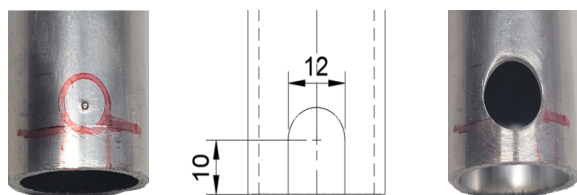
19. Insulator.stl

Insulator Assembly Highlights

Because the 3D-printed tube is non-conductive, it electrically isolates the feed point from ground. A small bump-out on the tube provides a mounting surface for the cable management system. To secure these parts, I embedded a brass threaded insert into the plastic and used long M4 screws.

One limitation of 3D-printed parts is their weakness across the layer lines, which can cause delamination under wind load. To reinforce the structure, I slid the plastic core inside an aluminum sleeve, cutting a notch at the bottom so the sleeve would fit flush.

After all 3D printed parts are done, we will start the build with the aluminum sleeve. We need to cut-out the notch at the bottom of the OD 29 x ID 25 mm aluminum tube (PART 6), so it fits over the bump-out in the 3D printed tube



The hole marked for drilling and the 12 mm hole is drilled



Instead of trying to drill a 12 mm hole close to the tube's edge, I drilled the hole slightly higher and then trimmed the excess.

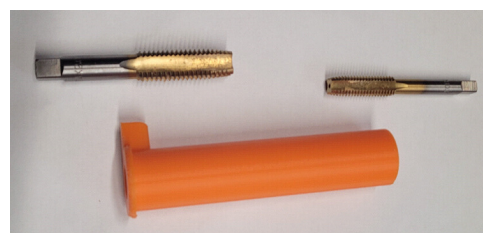
The extra length of the tube is cut away, and I used the file to flatten the sides of the cut. The sleeve fits nicely over the bump-out in the insulator tube (PART 19). The top of the tube is flush with the insulator as well.



After fitting, I spray-painted the sleeve black to match the rest of the antenna.

Thread prep

Because 3D-printed threads are rarely perfect, I designed the holes longer than necessary, then re-cut them with taps (M10-1.5 top, M14-2 bottom) for proper fit of other components into 3D printed Insulator (PART 19).



Next, I have installed two M4 x6 mm x6 mm Brass threaded inserts (PART 8) into Insulator tube and Guy Ring components.

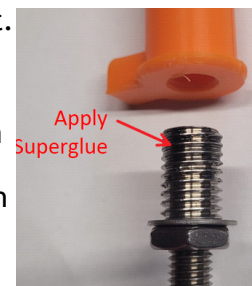


For the next step you need parts (3) Flat M10 hex nut, (4) Stainless steel flat washer, M10x20x1.2, (5) Threaded rod M10, 60mm and (9) Stainless Threaded insert OD M14-2 x ID M10-1.5 x 20mm.

Assemble the parts as shown, with the M14 insert on the top, followed by washer. The M10 rod is threaded inside of M14 insert, with the nut holding assembly tight.



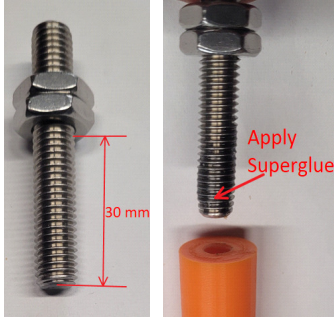
Apply a small amount of superglue to the top of M14 threaded insert (PART 9). Thread it into the bottom of the Insulator Tube using 17mm wrench until the washer is the flush with the bottom hole.



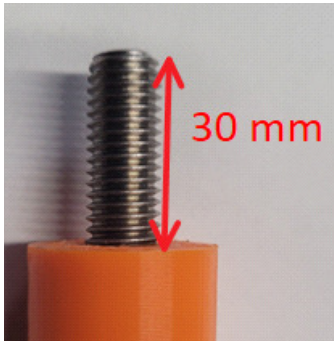


Remove temporary nut and washer quickly to prevent accidental bonding. The M14-2 threaded insert is now installed.

For the next step we will need two M10 nuts. Thread both on the top of threaded rod (PART 5), leaving about 30 mm at the bottom.



Apply few small drops of superglue on the 30 mm side of the threaded rod and thread it into the top M10 hole all the way, until the nut is flush with the surface of the Insulator tube.



Remove the nuts quickly and clean-up excess superglue.

There should leave about 30 mm of exposed thread.

Finally, install aluminum sleeve over the Insulator tube



We will continue with the Guy Ring installation. Place the 3D Printed Guy Ring (PART 18) over the threads on top of the Insulator tube assembly and secure with a washer (PART 4) and M10 nut (PART 3). Do not tighten the nut yet, as the Guy Ring should be able to spin to help line up the two threaded inserts in the next step.



Finally, install **cable management pieces**. Two 3D Printed cable managers (PART 16) were sandwiched with spacers (PART 17) and bolted to the Insulator using M4 bolts (PART 7).

Make sure that the opening in the cable manager is on the top, so it lines up with the opening in the Guy Ring.

The finished Insulator assembly is ready for use.

Tuned, elevated radials

Greg's original design features tuned, elevated radials. For my build, I used 16 AWG silicone wire (PART 11), cut to band-specific lengths. In his version, metal clamps add about 1.5" to the first link of the counterpoise wire, but I chose much shorter ring terminals that contribute only about 1/4" to the total length. Since I don't typically operate on the 6 m or 12 m bands, I decided not to cut radials for them at this stage — they can always be added later. See the wire-cut chart below.

- 10m - 79-3/4"
- 15 m - 40"
- 17 m - 29"
- 20 m - 49"

Wire preparation and assembly

For the 10 m links I cut two wires, each 79-3/4" long. I removed the plastic insulator from the ring terminal (PART 1) and will replace it with heat-shrink tubing (PART 10) to save space; the connector must pass through the openings in the cable manager. Because both the wires and the connector must fit through the small openings in the Guy Ring and cable manager, conserving space is critical. One of the 79-3/4" wires was crimped to the ring terminal. The terminal is sized for a thicker gauge, so I folded the wire back on itself to increase bulk and ensure a secure crimp.



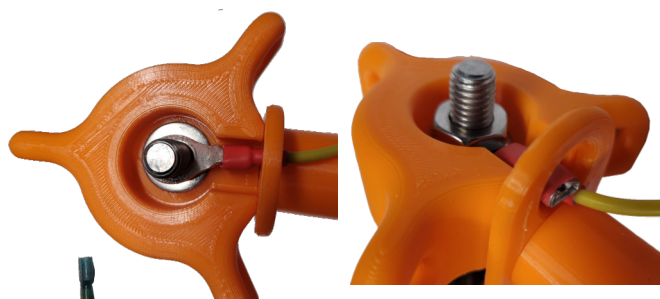
Here is the finished ring terminal

To enable 40 m operation (per Greg's design), two full-length radials are clipped together. I needed to make one of the radials easy to remove from it's spot at the Guy Ring, so I would be using a Ring - Spade connector assembly. I removed insulation from both connectors, and then used a Phillips-head screwdriver to expand the crimp barrel of the ring terminal (PART 1) so the spade connector (PART 2) could fit inside.

Squeezing the parts together required significant force, so I used a ratcheting crimper - the



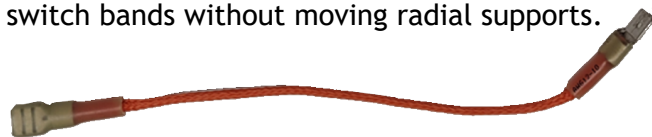
perfect tool for this step. After crimping, I applied heat-shrink tubing (PART 10) to insulate the completed Ring/Spade assembly.



Next, I removed the M10 nut from the top of the insulator, and fed the first wire (with the ring terminal attached) through the cable manager opening. Then I placed the Ring/Spade assembly on the ring terminal, and tightened the M10 nut to secure everything.

Finally, I installed band labels and female spade connectors on the other end of the wires. I continued with remaining wire lengths per the wire-cut chart.

To simplify band changes, I made short non-conductive “link ropes” (about 6” long). Those are inserted between wire lengths to electrically shorten the radials without changing their physical length, which lets me switch bands without moving radial supports.



Radial Supports

The radials must be elevated, with their ends about 3 ft off the ground. Fiberglass driveway markers are an inexpensive, ideal solution (PART 12). They are 48” tall, 5/16” diameter, and colored bright orange for better visibility.

I modified the markers for portability. First, I cut them in half for easier transport. A 3D-printed coupling joins the two pole parts; that coupling is glued to one pole section. In the 3D model I added ridges to provide a positive grip when connecting and disconnecting the sections.

Additional 3D Printed Parts

20. Pole Middle Link.stl

21. Pole Bottom Link.stl

22. Pole Top Cap.stl

I cut each pole in half, glued the Pole Middle Link (PART 20) to one section, and rounded the other fiberglass section’s end for a better fit into the connector.

I added a metal spike to the bottom of each pole so they drive into hard soil more easily. I built this part by cutting the bent tops off the spikes.



Then I cut grooves in the metal to give epoxy something to bite.

Finally, I placed the Pole Top Cap (PART 22) on each pole; the cap accepts a short rope with a spade connector for connecting the radial end.

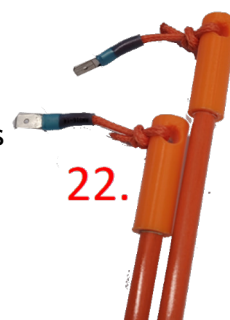
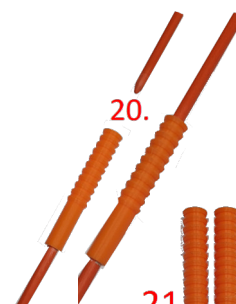
I glued everything together with two-part epoxy, protecting all the surfaces from glue squeeze with masking tape. The result is a lightweight, portable, and sturdy support system.

Final Build and Performance

With the conversion complete, the JPC-12 transformed into a true POTA PERformer. Using the original coil I can easily tune 40 m. On higher bands the coil can be omitted and tuning is quick and accurate via whip and radial adjustments. For extra stability I used ratcheting tent rope for the guy wires and larger tent spikes for anchor points.

Below is the part list. On the left I have parts of the original JPC-12

- A. Coil
- B. Feed Point
- C. Rods
- D. Ground Spike



On the right are the POTA PERformer conversion parts

E. 5.6 M Telescopic Whip. It is a later upgrade, as the original JPC-12 comes with shorter whip

F. Insulator and radials

G. Guy wires

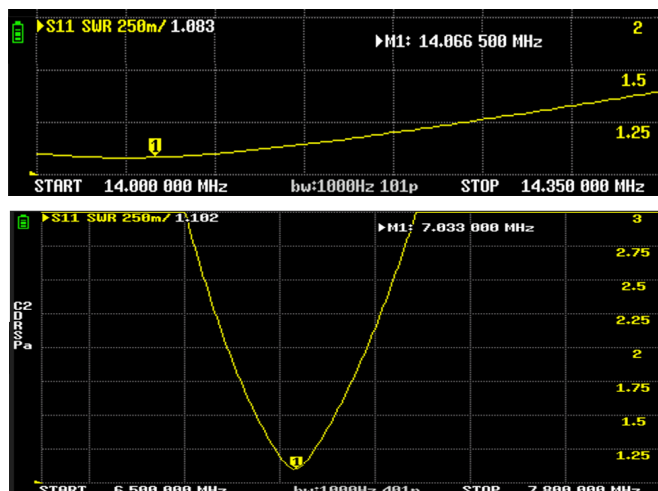
H. Ground spikes for Guy wires

I. Radial supports



SWR measurements

I used a NanoVNA to measure SWR; the results are very close to 1:1. Below are a couple of example readings for 20 m and 40 m.



Building a POTA PERformer from Scratch

If you don't already own a JPC-12, building a POTA PERformer from scratch is straightforward and often more cost-effective than buying and converting a JPC-12, since only a few original parts are reused. The objective remains the same: elevate the feed point to about 52" above ground.

My approach uses three aluminum tubes (OD 24 × ID 20 mm, 500 mm long) joined with 3D-printed plugs and threaded inserts, with a ground spike securing the base. You'll also need a SO-239 base adapter and the coil. I'm reusing the same 5.6 m telescopic whip and the insulator built earlier.

Additional parts to purchase:

23. Ground spike - [AliExpress link](#)

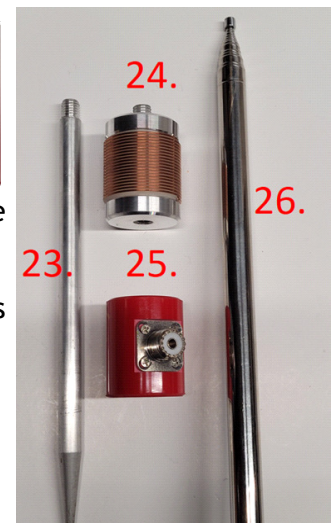
24. Coil - [AliExpress link](#)

25. SO239 base adapter - [AliExpress link](#)

26. Telescopic whip, 5.6M - [AliExpress link](#)

27. 3 x Aluminum Tube OD 24 × ID 20 mm, 500 mm - [AliExpress link](#)

Because the SO-239 adapter is symmetrical, I used a multimeter to identify which side is the antenna side and which is ground, and then affixed a couple of labels to avoid confusion.



A few parts used previously for the insulator are needed again; we'll need three more of each:

28. 3 x M10 × 60 mm threaded rod - [AliExpress](#)

29. 3 x M14-2 to M10-1.5 × 20 mm - [AliExpress link](#)

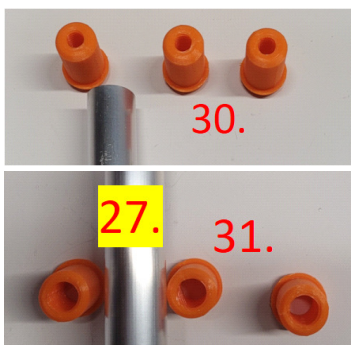


Additional 3D printed parts:

30. 3 x Top Insert.stl

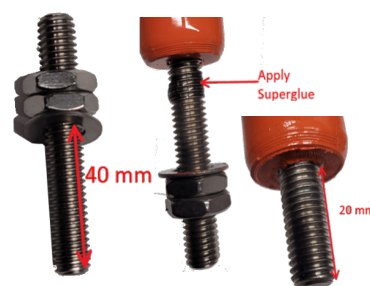
31. 3 x Bottom Insert.stl

As before, clean the threads in 3D-printed parts with a tap before assembly.



This should leave 20 mm of the thread exposed. Finally, I painted the rods bright orange to make them stand out in the park.

That's all that's needed to build the support structure. The completed scratch-built POTA Performer

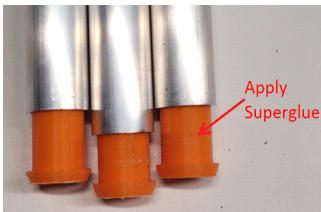


Building Feed Point support

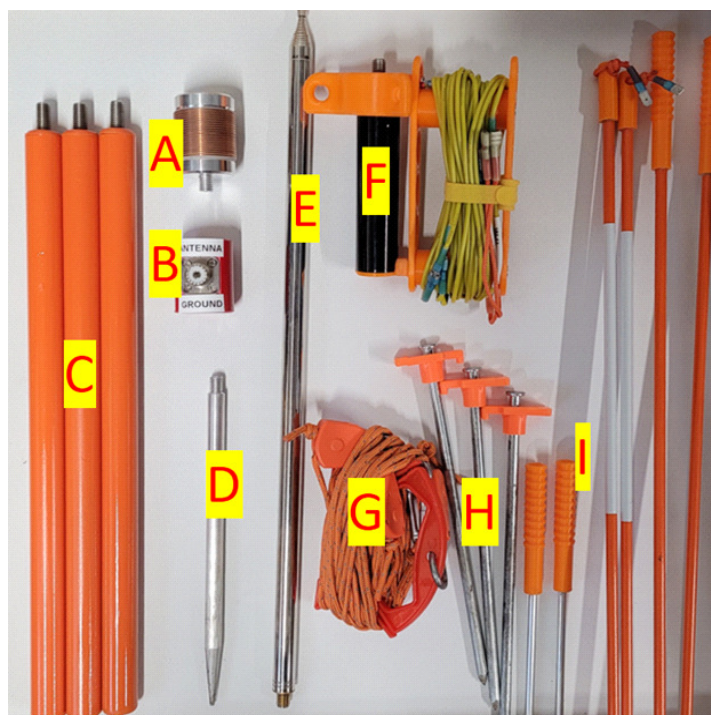
My design mirrors the JPC-12 connecting rods: rods bolt together to form a ~4 ft structure. One end of each rod has an M10-1.5 thread and the other end includes an integrated nut.



Steps

1. Cut about 93 mm from each aluminum pipe (PART 27) to obtain a total length of 407 mm ($\approx 16"$).
2. Insert the Top Insert (PART 30) and Bottom Insert (PART 31) into each pipe end. Drive the inserts in with a bit of superglue - it's a tight press fit. 
3. Install the M14-2 threaded insert / adapter (PART 28) into the bottom insert. Use the same technique employed for the insulator: screw the threaded insert onto the M10 rod (PART 29) using a washer (PART 4) and nut (PART 3) as a stop; this lets you drive the insert into place. Apply superglue to the outside threads for a permanent bond. 
4. Glue the M10 threaded rod (PART 29) into the 3D-printed Top Insert, threading about 40 mm of the rod into the insert. A few drops of superglue on the threads secures the joint.

Components



- a. Coil for operating on 40M band
- b. SO-239 Adapter, Feed Point
- c. 3x Support Rods we just built
- d. Ground spike
- e. 5.6 M Telescopic Whip. It is a later upgrade, as the original JPC-12 comes with shorter whip
- f. Insulator, Guy Ring and radials
- g. Guy wires
- h. Ground spikes for Guy wires
- i. Radial supports



Deploying in the field

To deploy, insert the ground spike, then assemble and insert the three support rods. Attach the insulator to the top support rod, then mount the feed point and antenna above it. Spread the radials and support them with the radial poles. With common hardware and a few 3D printed parts you'll have a fully functional POTA PERformer — no JPC-12 required.

Closing Thoughts

The POTA PERformer is an elegant, field-friendly design: lightweight, efficient, and quick to deploy. Its elevated feed point and tuned radials deliver excellent efficiency - typically over 90% - outperforming traditional ground-mounted verticals for park activations. Whether you modify a JPC-12 or build one from scratch, this antenna makes an excellent companion for POTA outings.

3D Designs

All 3D designs featured in this project are available on my Thingiverse page

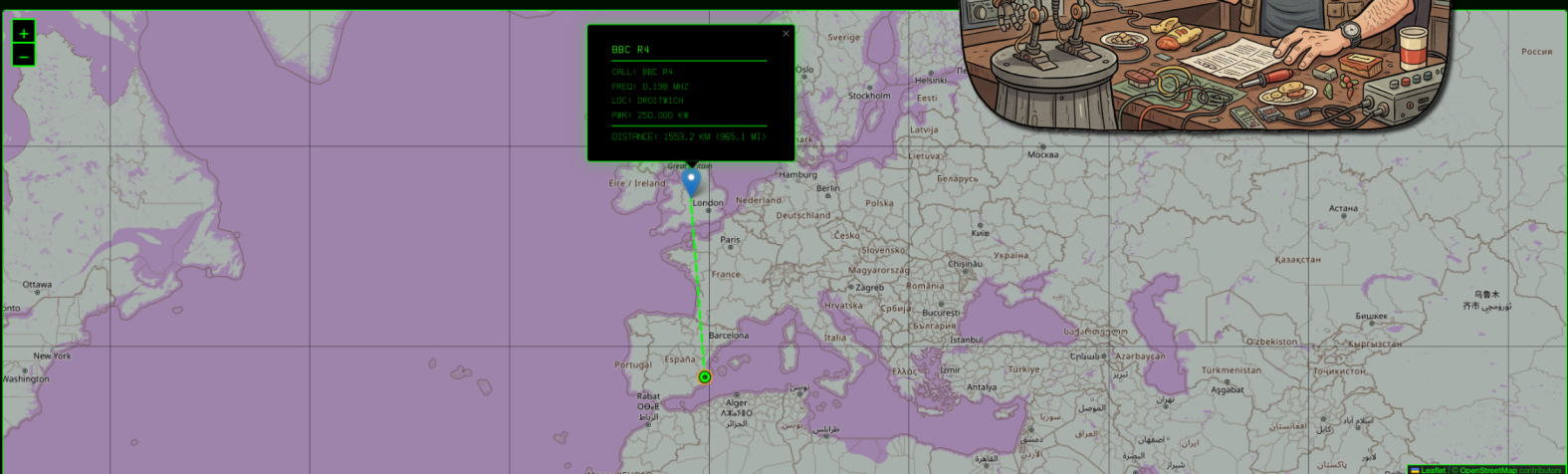
<https://www.thingiverse.com/va7dvo/designs>

~ Dmitry VA7DVO

RF and 3D printing

When using 3D printing for RF feed components at, in my case, 23 cm and higher frequencies, there is a wide range of filament materials to choose from. In discussions with, among others, SM6FHZ, I have often been reminded that the dielectric properties of these materials can significantly influence antenna performance.

With that in mind, I began investigating the subject and have summarized my initial findings on different 3D-printing materials in the following paper: "[Evaluation of 3D-Printed Filaments for Use in UHF Antennas and Waveguide Environments](#)".





Construction of the Simple Low Profile Multiband POTA Antenna

by JOHN CORBY VA3KOT

Following on from the previous post, there seems to be some interest in how the Simple, Low Profile, Multiband POTA antenna was actually built. Although the antenna is described as “simple”, that term relates more to how it is deployed and its appearance than its actual construction.

The construction does not involve any special tools or techniques, but it does involve some care to transform a photographer’s lighting tripod into a ham radio antenna. This is especially true since only the top two of the three vertical tube sections of the tripod are used as part of the antenna radiating element. The base tube section, to which the legs are attached, is only used as a support structure for the rest of the antenna. Thus the problem emerges of how to electrically isolate the top two tube sections from the bottom tube.

Where can you purchase such a tripod?

I was able to buy one from my local Habitat for Humanity charity store but a very similar product is available from Amazon. Simply search your local Amazon online store for “Amazon Basics Aluminum Light Photography Tripod Stand with Case”. It is a very inexpensive product - even here in Canada!

Where can you purchase the whip?

The whip can be purchased at hfportable.com (“Home of the Buddipole”). Search for the “Long Telescopic Whip”. I already owned one of these that I acquired several years ago and mine measures 9 feet 4 inches fully extended.



John Corby VA3KOT resides in Owen Sound, Ontario but is more often found operating CW out in the "Big Blue Sky Shack". He especially enjoys activating parks for the POTA program and blogging about his experiences at HamRadioOutsidetheBox.wordpress.com



The product on the Buddipole website describes it as being “nearly 10 feet long”. As an alternative you could use any 17ft telescoping whip extended to 9 feet. The tripod tubes form the other 4ft of the radiating element. Peter G3OJV advises against using a longer radiating element. Apparently 13 feet is the magic length for this antenna.

Adhesive copper tape

After completing the basic build I realized adding copper tape to the contact areas would be a good idea. There is a choice of copper tapes available from your friendly mom-and-pop Amazon store. I purchased 15mm tape which came on a 20m roll (20 meters, that’s interesting; I wonder what else I could use it for?)



Conductive grease

The tripod tubes nest inside one another allowing the tripod to be collapsed for transport and storage. This means contact will be made and broken at every deployment. Therefore I recommend conductive grease to lubricate, prevent oxidation and assist high conductivity where the tubes connect to each other.

Challenge #1: Joining the lower radiating tube to the bottom support tube

There are three tubes in the tripod. The top two tubes, along with the whip, form the radiating element. They must be electrically isolated from the bottom tube. Although the tubes are coated with a thin layer of black paint, continuous use may create scratches leading to unwanted conductivity. A short length of shrink tubing over the bottom of the second tube fixed that issue. Note in the picture the copper adhesive tape applied over a bare section of the tube (after paint was removed with a Dremel tool). This is where the feedpoint is connected.

Coax is attached by means of 3/8x24 CB mirror mount fixed onto the copper tape feedpoint area. This was described in the previous post. The mirror mount is fastened with two bolts with

wing nuts so that it can be moved when the antenna is taken down.

Bottom end of center tube showing the insulating section of shrink wrap and the copper tape connection area for the feedpoint.

There is a possibility that a very small capacitive coupling between the overlapping sections of tube will occur although no adverse effects of any such coupling have been observed.



The lower tube section is electrically isolated from the legs by means of plastic fixtures, so there is no ground connection. The lower tube section is therefore just electrically floating.

If any RF is getting across the junction of the two lower tubes due to capacitive coupling it is likely to be so small as to be inconsequential.

Challenge #2: A good electrical connection between the upper tubes

Isolating the top two sections of tube from the base section was relatively straightforward. Now the problem of how to ensure a very good electrical connection between the top two sections had to be dealt with.

The tubes are concentric, but are a loose fit to enable the intended light fixtures on top of the tripod to be raised and lowered easily. But the loose fit became a problem when the need arose to electrically connect two sections. Not just connect, but ensure a very low resistance connection was made. It would be highly undesirable if the connection were intermittent or had a high resistance. “High resistance” in this context could be as little as an ohm or two since the RF current this close to the feedpoint is quite high.

So here is how the problem was tackled. As can be seen in the accompanying image, two broad slits were sawn in the top end of the center tube section. The plastic clamps that secure tube sections together compress these slits.



Center tube (left) with slits. Top tube (right) with copper tape bulge

Now it was only necessary to use layers of copper tape to create a slight bulge at the bottom end of the top section of tube, where it mates with the center section. When the antenna is erected the copper tape bulge in the top tube engages with the compressed slits in the center tube and form a secure electrical connection.

Challenge 3: Connecting the whip



The whip is attached to the top end of the top tube of the tripod. It would have been very simple to use a CB mirror mount, but I wanted the entire assembly to appear as one continuous length of tube.

To achieve this it was necessary to fix a 3/8x24 coupling nut inside the top end of the top tripod tube. I guess I got lucky here

because one of the coupling nuts in my junkie drawer turned out to be a nice snug fit inside the tube. But a snug fit isn't good enough for an electrical connection so a tiny hole was drilled through the tube and coupling nut. A small nut and bolt was then added to ensure a tight fitting. For good measure, the outside surface of the coupling nut was coated with conductive grease to reduce the electrical resistance and prevent corrosion during use outdoors in the Big Blue Sky Shack.

~ John VA3KOT

A good idea for suspending radials



Fred Orsetti VE7IO has come up with what I think is an ingenious idea for suspending the ends of the PERformer and similar wire antennas that use raised radials. He found step-in electric fiberglass fence posts, 50-inch (1.27m) with adjustable clips & metal spikes on Amazon.

I used a felt pen to mark 6-inch increments so that I can place the radial at the height required. They go into the ground easily with the step-on foot and metal spike. They're non-conductive and the clips can be adjusted. Their colour also makes them very visible to passing foot traffic.

~ John VE7TI

A Portable Power Project

By Micheal Quilligan EI9GNB



Recently I started doing portable operations like POTA. I quickly realized that I needed portable power, I had two 7 AH 12v SLA batteries, and I wanted to use them for amateur radio and make them safe and easy to use.

I broke out my trusty measuring tape and took some measurements and proceeded to draw some add-on parts for the batteries, which I then proceeded to 3D print with PLA.

My first attempt was simple and basic, where I had two Anderson power pole outlets and a fuse holder, I was very happy with the result and I used that for some time and then one night out of pure boredom I decided to add to the project by putting an on-off switch, solar charger, 19v buck converter for charging laptops, and an LCD display to show voltage.

On the final assembly the Anderson mounts were fixed in place with a dab of hot glue then everything was stuck together with double sided sticky tape. When the battery interface wiring is complete, they are super glued together before installing on the battery.

I wasn't sure how it was going to turn out, but when I finished, I was pleased with the results. With one battery and a solar panel, normally it is enough to run my Xiegu x 6100 and my laptop for most of the day up to 7 hours plus. So as a small project I found it easy to assemble and I have some photos to add to this to give a visualization of what I have done.

The battery project is good enough for doing activations, the battery is compact and convenient- however, I don't think it would not be suitable for SOTA. The battery is slightly over 2 kilos and probably a little too bit heavy to carry up mountains, but since finishing this projects I have spotted 8 AMP hour 12.8v batteries that are lifepo4 and are built in the same casing as the SLA battery so it is not a big problem to move the parts over to the new type of battery.

The reason I'm considering the lifepo4 battery is that the battery has a built in BMS and the battery only weighs in at 1kg, so I think it would be a good upgrade for the project.

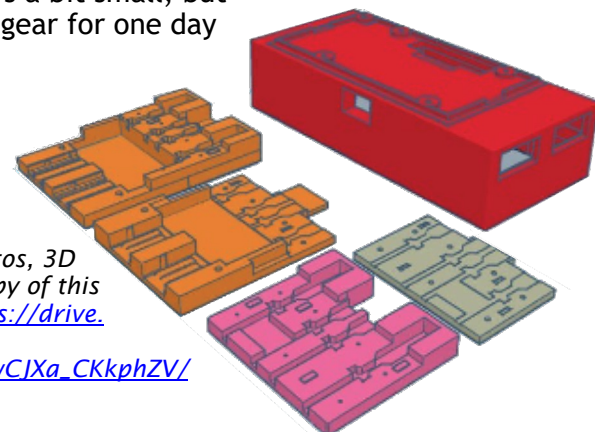
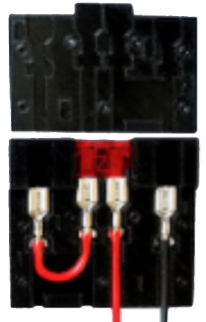
The added benefit to using the lifepo4 battery is the lifepo4 battery has a higher AMP discharge rate of up to 15 Amps with stable voltage-whereas the SLA battery seems to give about 10 amps on a good day before I see a voltage drop.

The solar panel that is used to charge the battery is a 12v panel it's a bit small, but good enough to run the gear for one day

Micheal Quilligan EI9GNB
EI9GNB@gmail.com

~

You can download the photos, 3D printer .STL files with a copy of this article as a ZIP file at: https://drive.google.com/file/d/1m92HSFwtN2V8ionOuqcwCIXa_CKkphZV/view?usp=sharing





Three Useful HT Accessories

by BOB WITTE KØNR



Bob Witte KØNR has a great blog site at <https://www.k0nr.com/wordpress/>

Bob is author of VHF, Summits and More



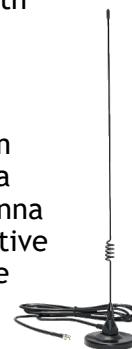
Here are three affordable accessories that can help round out your VHF/UHF handheld transceiver (HT) kit. These items can significantly improve the performance of your radio and make it more useful.

1. A Halfwave Antenna for 2m

I've already written about the RH660 antenna, which is a huge improvement over a typical rubber duck antenna. Make sure you get the version with the proper connector for your HT.

2. A Compact Magmount Antenna

Another handy antenna is a small magnetic-mount antenna for the 2m and 70cm bands. The primary usage of this antenna is on the roof of a vehicle, connected to your HT inside your vehicle. This puts the antenna on the roof, outside of the vehicle, working in concert with the effective ground plane of the metal roof. Note that for the magnet to hold, the roof needs to be made of a ferrous metal, not aluminum, fiberglass, fabric, etc.



This antenna can also function as a portable/temporary antenna by placing it on a steel object such as the top of a refrigerator, a cookie sheet, metal door frame, filing cabinet, metal folding chair, etc. The antenna is about 19 inches in length, so it packs well for travel. There are many models available, including this one on Amazon.

3. A Few RF Adapters

It seems that we often encounter incompatible RF connectors, so it is good to have a few adapters available to make the connection.



SMA Male/Female Adapters

These days, handheld transceivers have SMA antenna connectors, but some models provide a male connector, while other radios have a female connector. Having a few SMA adapters can deal with this issue.



SMA to BNC Adapters



BNC connectors often show on various radios and cables, so it can be handy to adapt this popular connector to an SMA.

SMA to PL-259 Adapters

The PL-259 and its companion SO-239 are the most popular RF connectors for ham radio use, so you may encounter one of these. (I try not to call them UHF connectors: see About That UHF Connector.) They are not used on HTs, but you may find an antenna cable with one of these attached. Again, an adapter or two can help you make the connection to an SMA connector.



These are some handy devices to have along with your HT.

Any other suggestions?

73

~ Bob KØNR

P.S. If you are having trouble identifying the connector on your HT, take a look at this article: [What's That Connector On My HT?](#)

A New 2m/70cm Telescoping Antenna

I came across this new antenna, the TWAYRDIO RH 660S, mentioned in this Ham Radio Crash Course video. I have previously been recommending the TWAYRDIO TH770 antenna via this post. The RH 660S is a newer dual-band 2m/70cm telescoping antenna from the same company.

For [Summits On The Air](#) (SOTA), I generally take along such an antenna. The performance of any half-wave antenna on a handheld radio is always much better than the standard rubber duck. Although a 3-element Yagi antenna provides even better performance, it has to be pointed in the right direction. Sometimes, we will set up the RH 660 or TH 770 on a small vertical pole (actually a camera monopod with a homebrew BNC attachment). This allows us to monitor and work the band with an omnidirectional antenna without having to hold or point the Yagi. Much more convenient while sitting on a summit eating lunch.



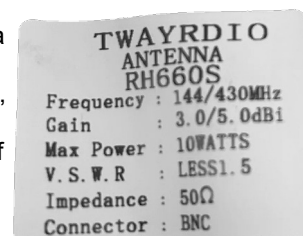
A key advantage to an omnidirectional antenna is that it is always pointed in the right direction.

The RH660 is available with the three standard connectors: BNC, SMA Male and SMA female. Make sure you pick the right one that matches your radio. The RH660 collapses down to a small size.



On our most recent SOTA activation, I did a quick comparison between the old TH 770 and the new RH 660 on 2 meters. The RH 660 seemed to perform ever so slightly better, but that was probably within the measurement error of the test. It certainly was not worse than the TH 770. I only did the comparison test on 2 meters, as that is the GO TO band for VHF SOTA. However, the antenna seemed to work OK on 70cm as well.

The [packaging on the antenna](#) indicates 3.0 dBi gain on 144 MHz and 5.0 dBi gain on 430 MHz. Do I believe those numbers? Not really, but they are probably close. (An ideal halfwave radiator has a gain of 2.2 dBi.) Note that the newer antenna does not have the magic tuning lump in the middle of the radiating element, which simplifies the mechanical design. This is the main advantage of the new antenna: no lump in the middle, resulting in a slimmer and sturdier design.



I am pleased with this new design, and I now recommend it as a good compact antenna for portable use. As with all telescoping 2m half-wave antennas, it is long and should be handled with care. Otherwise, you can poke someone's eye out, break it in two, or snap the connector off your HT.

The RH660 antenna is available at Amazon for ~US\$17, C\$22. At this price, why wouldn't you have one in your backpack or Go Bag?

~
[Bob's original article](#)

Zero Retries



Imagining the Future of Software Defined Amateur Radio

by STEVE STROH N8GNJ



Zero Retries Digital Conference 2025

Admittedly it's a bit of a "cheat" to refer readers of this column to another periodical, but in discussing Zero Retries Digital Conference 2025, which was held on September 13, 2025 in Everett, Washington, USA, I did a complete writeup of ZRDC 2025 in my newsletter Zero Retries 0220 - <https://www.zeroretries.org/p/zero-retries-0220>. It was an amazing experience to have selected all of the speakers, and then be mostly a bystander and "soaking in" the presented wisdom of those speakers. You'll be able to judge for yourself as we plan to release all the videos and other conference material on 2025-11-01. On that date, see the ZRDC page at <https://www.zeroretries.org/p/conference>.

Imagining the Future of Software Defined Amateur Radio

In one sense we've been living in the era of Software Defined Amateur Radio for perhaps a decade now. Many modes we commonly use now - FT8 - <https://en.wikipedia.org/wiki/FT8> comes to mind, are "mostly software". Most of what makes FT8 usable is software running on a host computer. But FT8 (software) is more of a "modulation" that only works by modulating a typical HF radio transmitting Single Sideband (SSB).

But in the Software Defined Amateur Radio era, even the SSB transmission of a radio, not just the FT8 waveform, is now under the control of software. Currently we "piggyback" digital modes, like FT8 (data), and recently FreeDV (digital voice) on SSB only because SSB is easy and inexpensive because we've been doing it for about a century or so. But in 2025... we don't have to "fall back" to SSB as "the best we can do", because now, with Software Defined Amateur Radio, we

Steve Stroh N8GNJ is the Editor of the Zero Retries newsletter (<https://www.zeroretries.org>) which promotes technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology.

When not writing Zero Retries, Steve experiments with Amateur Radio data radio systems in N8GNJ Labs (his shop) in Bellingham, WA,.



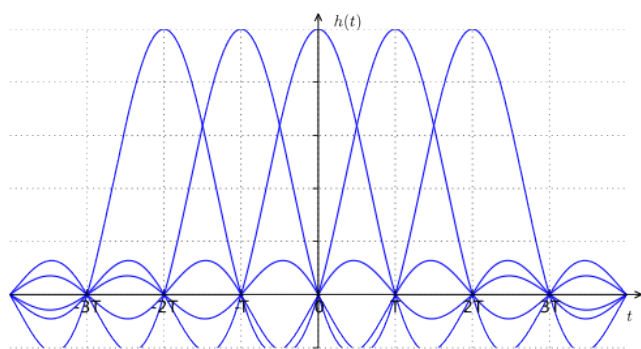
can completely control the transmitted waveform to be whatever we can imagine it to be.

Side note - “good old SSB” isn’t so “old” any more. Polar Modulation - https://en.wikipedia.org/wiki/Polar_modulation is a technique for much more efficiently generating SSB now implemented in the QRP Labs QMX/QMX+ transceivers, and the new FlexRadio Aurora.

Here in the US, the FCC recently eliminated arcane regulations regarding data modes on HF, settling on a compromise of “maximum bandwidth of 2.8 kHz”. Thus whatever mode we can imagine and create, as long as it stays within some minimum parameters:

- Within allocated Amateur Radio spectrum, including specified use sub-bands
- Maximum of 2.8 kHz bandwidth
- Unspecified digital modulations “publicly disclosed”
- “Minimum transmit power” used to ensure reliable communication

...we can use. One example: Orthogonal Frequency Division Multiplexing in the radio domain.



https://en.wikipedia.org/wiki/Orthogonal_frequency-division_multiplexing

What’s different about OFDM is that it breaks the transmitted signal into many subcarriers, each of which is managed independently. Each subcarrier is slightly different in frequency, and has its own modulation, power, Forward Error Correction (FEC), etc.

If you’ve already heard of OFDM being used in HF Amateur Radio, it’s because OFDM is now in common use in:

- VARA HF
- FreeDV
- Fldigi OFDM - http://mail.w1hkj.com/FldigiHelp/OFDM_page.html

However, those modes make use of OFDM in the audio domain. With SDR technology, the advantages of OFDM can now also be applied to the transmitted radio signal. Instead of transmitting SSB with an OFDM modulated audio signal, the radio signal can be broken up into subcarriers, each with its unique modulations.

If OFDM sounds complicated, it is. It’s very compute intensive - it’s only possible to implement OFDM as a digital mode with fast compute power. Unlike legacy modes like SSB that were born in the analog era, OFDM is only possible to implement with a fast computer to do all the math, both encoding and decoding.

One of the first times I heard of OFDM was in the early 2000s when a new fixed broadband wireless system was being demonstrated to me, and the demo was deliberately challenged by pointing the directional antenna, at the back of a truck, into the truck, and the data kept flowing. The debug display computer showed how much “harder” the person giving me the demo joked that OFDM was possible two decades earlier... but to make OFDM work in that era would have required shipping a Digital Equipment Corp. VAX minicomputer with each system.

Another example of a “new” mode in Amateur Radio made possible by SDR technology is Frequency Hopping Spread Spectrum (FHSS). In fairness, FHSS isn’t a new mode - it was created in 1941 by Hedy Lamarr and George Antheil - U.S. Patent No. 2,292,387, titled “Secret Communication System”. In Amateur Radio, FHSS could be used even in the crowded 2 meter band because the hopping “dwell time” can be minimal, such as 100 mS.

Yet another example of a new mode made possible only by SDR technology is Opulent Voice (OV) - <https://www.openresearch.institute/>

[2025/09/12/opulent-voice-progress-report-issue-22/](https://www.open-space.org/2025/09/12/opulent-voice-progress-report-issue-22/). OV is a project sponsored by Open Research Institute. The idea with OV is to take advantage of higher bandwidth data modes that are now possible on VHF / UHF to provide a higher quality of digital voice. One aspect of OV that I really like is that OV implements an interleaved data mode - an OV user can seamlessly switch between transmitting voice, or data, even packet by packet.

But one of the most interesting aspects of OV is that it was implemented entirely as a Software Defined Radio mode. It doesn't use any legacy radio technology - it's not implemented as a "modem" to be transmitted over a VHF / UHF FM (or SSB) radio... it's provided as an "image" to download into an inexpensive Analog Devices ADALM-PLUTO Software Defined Transceiver - <https://www.analog.com/en/resources/evaluation-hardware-and-software/evaluation-boards-kits/adalm-pluto.html>

The "Pluto" is a very low power device typically used for learning about SDR by Electrical Engineering students, but it's been widely adopted for use in Amateur Radio.

In citing OFDM, FHSS and OV, those technologies are just some examples that illustrate the capabilities and flexibility of using SDR technology in Amateur Radio. The same radio hardware can be used for all of these modes... and many more. I'm confident to predict that by the end of 2026, we will see a lot of Software Defined Transceivers available for VHF / UHF, enabled by the groundbreaking, inexpensive SDR technology created by the M17 Project's LinHT project discussed in my previous column.

open.space

On October 10-12, 2025 my wife Tina and I attended the Pacificon 2025 conference - <https://www.pacificon.org/> in San Ramon (Bay Area) California. Zero Retries had a table at Pacificon and to introduce Zero Retries, we were joking "We're selling free Amateur Radio newsletters. My full writeup of my experiences at Pacificon are in Zero Retries 0224 - <https://www.zeroretries.org/p/zero-retries-0224>. The following is an excerpt from that issue.

The "Oh... WOW!" of Pacificon 2025 was, for me, the hallway exhibit by open.space - <https://open.space>

Our first kit is a low-cost digital phased array, with high transmit power and excellent receive sensitivity. It supports flexible transmission modes across any 40 MHz bandwidth in the C-band (4.9-6 GHz).

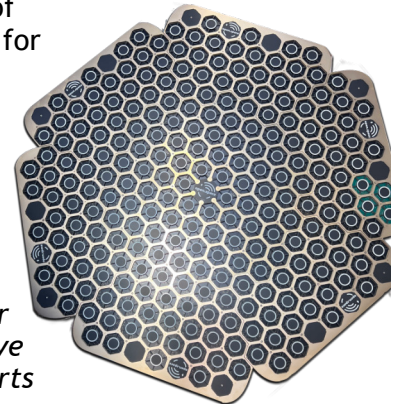
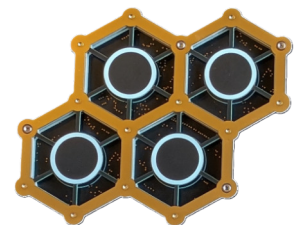


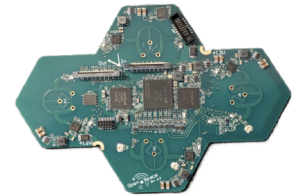
Photo above by Steve Stroh N8GNJ)

This display unit shown above was mostly a mockup / prototype, but it beautifully illustrated their concept. Each cluster of four units - *Quad: A Software-Defined Radio Tile...*

Photo below open space



...is independent, but capable of synchronization / beamforming (phased array). The interconnection for data / control / synchronization / beam forming is via daisy-chained jumper ribbon cables on the back. Not exactly elegant, but it works. But the power distribution (which, remember, has to deliver a consistent power supply across the entire array) was pretty ingenious - as each Quad is screwed into the frame, the front "plane" that each Quad is pressed into provides power (or ground), and the screw that secures each Quad to the frame from the back provides power (or ground). (I didn't learn which "power" plane was which.)



Here's some of the specs from their website:

Overview

This 4-antenna SDR tile designed for arraying. Drop-in compatible with Raspberry Pi pipelines (GNU Radio, Python/C++, SoapySDR) .



Useful as a standalone SDR or as a building block for larger phased arrays.

Key features

- Frequency: **4.9-6.0 GHz** (C-band), full duplex
- Per-antenna bandwidth: **40 MHz**; 8+8-bit I/Q
- Tx power: **1 W** per antenna • Rx NF: **~1.2 dB**
- Polarization: **RHCP** (Tx), **LHCP** (Rx)
- MEMS TCXO • Jitter **~1.4 ps**
- FPGA: **Lattice ECP5** • Latency **< 1 ms**
- Power: **12 V DC** (~25 W peak)

Standalone applications

- General-purpose 4x4 MIMO Software-defined Radio
- Fox-hunting, direction of arrival (DOA), RF exploration
- [Open Wi-Fi](#) router, [Open 4G/5G](#) base station
- Drone HD links, robotics communications

Think of that last application... *imagine how useful that single application will be!*

And this is an open source project!

This project, and these developers, will get some serious attention, fast, from numerous applications. This could easily become a new product / service providing high speed data links on 5 or 6 GHz from a high rise apartment balcony.

[AREDN](#) developers... *PING! Imagine adding a spatial / steering component to AREDN!*

At the table, they were swamped with attention. I was only able to get 30 seconds or so of attention from one of the booth staff, and the primary developer (whose name I didn't get) was completely swamped every time of the numerous times I returned to the table hoping for a brief conversation.

And... my favorite potential application for open space is... **space!** Especially a potential Geosynchronous Earth Orbit (GEO) payload... or now, with a beam steering capability, even Low Earth Orbit (LEO) satellites. A page about

[Amateur Radio GEO](#) will be one of a number of dedicated "consolidation" pages (as this issue is published, it's largely blank). As that page will eventually explain, a previous attempt at an Amateur Radio GEO for the Western Hemisphere used the 5 GHz band as uplink, and 10 GHz band as downlink. Thus open.space's capability to "focus" the energy of a number of low power 5 GHz modules would seem one way to generate a sufficiently powerful signal for communications with a GEO payload or satellite.

Weeks later, I'm still excited thinking about the possibilities of this project.

At moments, my mind reels trying to bridge the span of radio technologies that have developed in my lifetime. When I was trained as an electronic technician in 1978-1980, one of my courses was in how to repair vacuum tube televisions and radios. Other courses included digital logic and assembly language programming. Now we're using the capabilities of (what were then) supercomputer scale processing power... for a relatively low cost Software Defined Transceivers. Now that we can "just sit down and write new radios", Amateur Radio Operators have the capability to develop innovative new radio technology - again!

One last bit of food for thought on this new era of Software Defined Amateur Radio - at the GNU Radio Conference 2025 held the week before ZRDC 2025, I was told that more than half of the 100+ attendees at that conference were already licensed Amateur Radio Operators. And, at the Volunteer Examiner test held at GRCon 2025, seven attendees obtained a new or upgraded Amateur Radio license. Not only are such Software Defined Radio professionals interested in innovating with SDR in Amateur Radio... with their existing experience with GNU Radio, they're very capable of doing so.

I can't wait to see what interesting new radio technology they will develop... and test... and deploy in Amateur Radio.

~ Steve Stroh N8GNJ
steve@zeroretries.net

KB6NU'S HAM RADIO

Margaret Atwood on CW?

And do we even need QST

by DAN ROMANCHIK KB6NU



Dan Romanchik

KB6NU blogs about amateur radio at KB6NU.com when he's not trying to figure out which way current flows. Dan teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at cwgeek@kb6nu.com

I like to read nonfiction by great writers. So, when I found the book, *Burning Questions and Occasional Pieces* by Margaret Atwood on the shelf at the Ann Arbor District Library, I picked it up. Margaret Atwood—for those of you who don't know her—is a renowned Canadian author, perhaps most well-known for her book, *The Handmaid's Tale*, which has been adapted for both film and TV.

Burning Questions and Occasional Pieces is a collection of essays. In the essay, *Five Visits to the Word-Hoard*, Atwood talks about how she writes and what makes a successful writer. She says,

"You can work at a thing, and you can learn it. But, only up to a point. Beyond that comes the talent, which is a given. It's there or it isn't there, in varying quantities, and it can't be predicted or demanded, and it is not reasonable and predictable, and it can

be with you at one point in your life and then vanish. Practising a craft can awaken a dormant talent.

Conversely, too much practising can kill it. Such matters are incalculable, and much depends on coincidence and luck."

I think that operating Morse Code is kind of like this. Most everyone can learn how to send and receive the code, but not everyone is going to be able to operate at 50+ words per minute. To do that, it takes some talent. But, even if you have a talent for the code, you need to practice to realize that talent.

As for awakening a dormant talent, you may never know that you have a talent for Morse Code unless you try it. Back



Margaret Atwood.



in the 1970s, we didn't have a choice as to whether we wanted to try it or not. That's not the case today, so if you're a licensed radio amateur, I'd encourage you to give it a try. It might wake up that CW operator inside you.

As far as too much practice killing your desire to operate Morse Code, I'd say that there's some truth in that, too. If you think that you're overdoing it, back off a little. Knowing Morse Code is not a matter of life and death, after all. It's just another part of our hobby, and hobbies are supposed to be fun.

Do we even need QST?

A couple of days ago, I got an email from SWR Magazine, announcing their fifth edition. SWR is a publication produced by a group in Puerto Rico, including Editor Jose Candelaria NP4ET, Technical Editor Juan Montivo WP4OV, and Assistant Editor Serafin Martinez KP4FIE. This is the first issue that I've seen of this publication, and honestly, I'm impressed.

This issue has a number of great articles, including:

- Building Your Own End-Fed Half-Wave Antenna by Isidro de Jesus WP4NXI
- Understanding MUF by Juan Montijo WP4OV
- Lightning Protection for the Amateur Radio Station by Serafin Martinez KP4FIE
- and several more.

This isn't the only self-published amateur radio magazines out there. Others that come to mind are:

QRP Quarterly, which is a benefit of joining QRP-ARCI.

The SARC Communicator, published by Surrey Amateur Radio Communications (SARC) of British Columbia. —*Thanks Dan! - Ed.*

Ham Radio Ireland.

These magazines are so good, that I'm not really sure that we need QST anymore. I don't know about you, but since they've gone electronic, I rarely feel the need to read QST. To be fair, the latest issue did have a couple of interesting antenna articles, but publications like the Communicator and SWR, coupled with the plethora of amateur radio YouTube channels and podcasts more than supply my need for information.

I urge you to subscribe to these magazines. Aside from QRP Quarterly, they are free. And, if you're a writer, I urge you to contribute to these publications. The SARC Communicator usually includes one of my blog posts, and I have published articles in both QRP Quarterly and Ham Radio Ireland. I'd be happy to help you write an article for one of these magazines.

~ Dan KB6NU

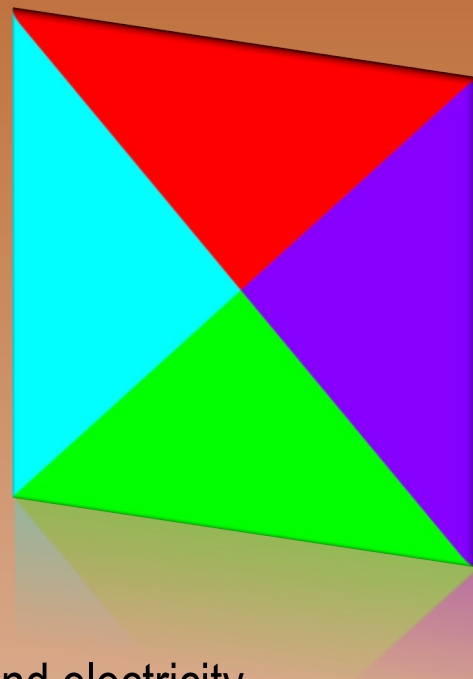


Social Reminder

The Saturday weekly social gathering is once again 'on' at the Denny's Restaurant, 6850 King George Blvd., Surrey BC from 07:30—09:30. All are invited. Afterwards, we will host workshops and will be available to invigilate Amateur Radio exams at the OTC, 5756—142 Street, Surrey from 10-noon.

Bring your ham issues, our Elmers will try to help you sort them out.

Foundations of Amateur Radio



When your hobby revolves around electricity...

by ONNO BENSCHOP VK6FLAB



**Onno Benschop
VK6FLAB**

To listen to the podcast, visit the website: <http://podcasts.vk6flab.com/>. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

Full instructions on how to listen are here: <https://podcasts.vk6flab.com/about/help>

The other day I went on my first POTA or Parks On The Air adventure, this time I was on my own. If you recall, my power company announced yet another planned network outage and I felt that I could use this time without electricity to my benefit, for a change.

As is traditional, I did all the prior planning to prevent pretty poor performance. I made a list, checked that all the items on the list were in my kit, packed the kit days before, put it all ready to go in the hallway the night before, packed the car on the day and set out on my adventure.

I will confess that I was slightly more sweaty than anticipated when I set off because the umbrella in the boot of my car has a nasty and recurring habit of getting in the way, specifically it stops things from getting pushed right to the full depth of the boot. Mind you, it wasn't until I started getting agitated that I realised that it wasn't the umbrella's fault entirely this time, since as it turns out, the folding chair that I was attempting to jam in place doesn't actually fit longways into the boot.

Anyhoo, I set off and visited the local petrol station. I was not prepared for a customer to spend 15 minutes dribbling the last bit of diesel into their pretend Sports Utility Vehicle, but he looked like he was up for a fight, so I smiled sweetly and waited for him to pay and move his box on wheels.

After paying for my own fuel and driving off, the pressure in my bladder had gotten beyond the "cross your legs and hope for the best" stages and I swiftly made my way to the nearest shopping complex where a local pharmacist



helpfully told me that there were no toilets in the building and that the local hotel or fast food joint were the place to relieve the pressure.

One problem .. they were both closed.

At this point I was in pain, and discovered that I couldn't read the screen on my mobile phone in the lovely sunlight, because it was set to battery saving mode, since my charger was at home where the power was out. After disabling the battery saving mode I opened the local public toilet map shortcut on my phone, and discovered that fortunately the shortcut still worked, opening up my default browser, which suddenly didn't want to display a map. Copied the URL to another browser, still in pain, finally a map. Click on the nearest icon and it navigates me there from Darwin, or over 4,000 km from where I actually am. Luckily it has the GPS location which I copy and then paste into my mapping app, and I can finally navigate to the nearest toilet. Several comment worthy navigation moves later, I drive into the car park, lock the car, painfully shuffle to the building, do my business in the very clean facilities and then decide that I should just stop, sit, and take a breath.

So, I get in the car and discover that my partner was right when they heaped scorn on our newly acquired thermos cup. It really does hurt your nose when you try to drink from it and the sharp edges in your mouth do nothing to make the experience joyful.

Meanwhile there's some trucks moving around in the car park and a guy walks up to the car to ask me if I can move because they want to move a third, or was it forth, truck into the space. I swallow my sip of restorative coffee, wipe the now wet bridge of my nose, and move the car, only to be blocked from leaving the exit thanks to the slowest reversing truck I've ever encountered, one who then proceeds to sit at the next intersection for five minutes without indicating where it was going.

Are we having fun yet?

I finally made my way to the main road where I attempt to calm my nerves with the help of a Morse code edition of my podcast. It's been the

only exposure I've had to Morse for way too long. This accompanies me to my first destination, breakfast.

I'm going to skip past the drivers in the centre lane driving at 10 km per hour below the posted speed limit, or the ones who think that jumping out of a side street in front of you is normal and safe driving practice.

At every traffic light I celebrate the pause with a sip from my coffee and a furtive wipe of my nose which is being assaulted by the lid of the cup.

I arrive at my breakfast destination and fear the worst. Their car park is almost empty. I've never seen it this quiet and I didn't check to confirm that they were open, or not. I look at my map application and remember to turn my phone back to battery saving mode. According to the Internet, my cafe is open, so I cross my fingers and get out of the car.

To my delight, they are absolutely open, make me a lovely breakfast and provide the needful for lunch too .. I have a big day planned after all.

After enjoying breakfast and hot chocolate, with two marshmallows, I get back in the car and navigate to my planned set-up location. As I drive into the park I notice something that I hadn't the last time I was here. I'm descending, as-in, the deeper into the park I go, the more I go downhill. That in and of itself isn't a cause for concern, were it not for the fact that the local repeaters are on the hilltops that overlook the city and I'm several hills inland and travelling into a valley. I'm keeping my eyes open for side roads and alternatives, but gamely proceed to the formal entrance of the park, where I pay my \$17 to have a car with a maximum of 12 passengers enter the National Park.

I drive to the location I have planned and discover that there's a car park quite close to the gazebo I've earmarked, so I park there. I figure that before I get all set-up in the gazebo for a day of radio, I should first check what I can learn from where I'm parked, especially since I'll need to pull the gear out of the car either way

.

Before I get out of the car, I attempt to mark my actual location on the map, only to discover that there's no mobile phone coverage, so much for using Echolink as a fallback.

I pull out the folding table which neatly fits next to the car, dig out the coax from the boot and lead it out the passenger door. The other end is connected to the boot-lip mount that has been there for years. In case of failure I did bring a magnetic base, but I'm optimistic. I remove the HF and VHF multi-band antennas from their storage spot, taped to the driver side rear passenger roof grab handle and pull out the previously errant folding chair. All is going well.

I pull out the spare coax and my anxiety spikes a little, this is what I think might be what causes me to come unstuck. It's a 10 meter or so length of coax, it's untested, terminated with BNC and I'm concerned that I didn't bring enough adaptors beyond the BNC to PL259 and the SO239 barrel I packed hastily the night before.

I push away my fear, since I'm not needing this right now and continue to unpack the radio, noticing that to my immense relief, the knobs are still attached, set it all up, pull the power cable from the 12 Volt, 80 Amp hour AGM Deep Cycle battery, "ideal for 4WD, caravan and camping trailers", which I bought four years ago to power my dash cams and radio. It's automatically charged by a 360 Watt DC to DC converter that's connected to the alternator in the car - because I don't want my dash cams, or radio for that matter, to stop me from starting the car. Ask me how I know.

The power leads are long enough to make it out of the boot and I connect the inline volt meter to the battery, 12.6 Volt, the same as what I saw when I checked it a week earlier.

I mount the VHF multi-band antenna, connect it to the radio after pulling out the N-Type to PL259 adaptor which is on the list and part of the standard kit.

I take a breath and turn on my radio. Tune to the local repeater frequency and hit the PTT. The radio is set to 5 Watts and I'm hoping to hear the repeater tone.

Nothing.

I check all the repeaters in my radio, about seven of them, none of them do anything.

Then .. I hear a click.

I've been "on-air" for all of three minutes. I notice the radio is turned off. I've seen this before, sometimes stray RF gets into something and causes the radio to stop. I turn it back on and notice the voltage on the display of the radio, 9.65 Volts.

That... is... not... good.

I check the inline volt meter, it doesn't even display anything. I turn off the radio to save what little power I have.

I take a moment to consider and attach the HF antenna, hoping that I can run the radio for a few seconds to check the local 10m repeater. All is good to go, turn on the radio and it won't even turn on, just flickering on and off.

I feel like I want to cry, but there doesn't seem to be

any point.

I pack everything back up, the water, my hat, the radio, the coax, the antennas, the table, the chair, put it all back in where it came from, even the sandwich I was going to have for lunch.

After slowly reversing out of the car bay, looking carefully at the ground to make sure I didn't leave anything behind, I make my way out of the park. I've been there for a grand total of 29 minutes.





I briefly entertain the idea of going to the nearest electronics store and spending \$50 on a small battery, but I don't actually have a working charger, and spending several hundred dollars on a charger and battery is not really in my budget at the moment.

Whilst I was driving home I got a notification that the power was out at my QTH. I got home 52 minutes after the power went out. It stayed off for the next six hours. So much for being productive.

My friend Charles NK8O, tells me that his first few activations were a bust. He's a Sapphire POTA activator with 609 activations across 372 parks, so, there's hope for me yet.

In looking back at this adventure, I was planning for failure. I'd thought through all the different permutations of what might happen. Not for one moment did I consider that my battery might be a single point of failure.

That said, there were hints that not all was well. The 12.6 Volts was one hint, the fact that my dash cams have been acting up was another. I had been on the hunt for a battery monitor for the past two years to discover precisely what was going on, but I haven't found one that doesn't require a specific app that needs to know where you are or what's in your diary, so I put it out of my mind. As it happens, that was where I made my rookie mistake.

Mind you, part of me knows that I don't have another battery anyway, so it really didn't matter if the battery was faulty or not. Either way, I wasn't going to connect my radio to my car battery, I learned that lesson well over a decade ago.

I'm back to the drawing board. It's unlikely we'll use that location to activate for the 750th edition of F-troop, but when I get my power situation sorted out, it's still a lovely place to get on-air and make some noise.

~ I'm Onno VK6FLAB

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>. Volume 7 is out now.

Feel free to get in touch directly via email: cq@vk6flab.com, follow on twitter: [@vk6flab](https://twitter.com/vk6flab) or check the website for more: <http://vk6flab.com/>

If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6flab.com/>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link, IRN and 2m/70cm FM via various repeaters.

If you'd like to participate in discussion about the podcast or about amateur radio, you can visit the Facebook group: <https://www.facebook.com/groups/foundations.itmaze>

This podcast episode was produced by Onno (VK6FLAB). You can find more at <http://vk6flab.com/>

On All Bands: Where did all the signals go?

If you've spun the dial on your HF transceiver lately and found nothing but static, you're not alone. For many operators, the once-bustling shortwave spectrum sounds more like the emptiness of deep space than a lively ham community. The answer may be here: <https://www.onallbands.com/ham-radio-insights-where-did-all-the-signals-go/>

Back to Basics

From The Canadian Basic Question Bank

Digital Modes

Continuing our review of the recent Canadian Basic Question Bank amendments...

There is an entirely new series of question in the revised question bank. These are in Section B-003-007 with an accompanying diagram “Current Digital Modes”. There are still several questions and a diagram for “Legacy Digital Modes”. The reference diagrams are also new. They are provided for study purposes with labelled formulae and block diagrams. For the exam the document is provided as a reference, but without the labels.

Three of the questions for current digital modes:

B-003-007-001 Which of the following is a function of the sound card interface in a station operating computer-based digital modes?

- a. To convert the received analog audio signal from the transceiver into a digital signal for the computer
- b. To convert the received digital signal from the transceiver into an analog signal for the computer
- c. To amplify the digital signals to be sent by the transceiver
- d. To demodulate the transmitted signal.

B-003-007-005 Why are isolation transformers often included in the sound card interface of a station operating computer-based digital modes?

- a. To prevent the coupling of the transceiver and computer from introducing hum and interference into the transmitted signals



John Schouten VE7TI has been teaching amateur radio courses for over 25 years, and is the Course Coordinator for Surrey Amateur Radio Communications

- b. To increase the signal voltage generated by the computer to the level required by the transceiver
- c. To match the impedance of the computer output signal to the impedance of the input of the computer
- d. To provide a source of DC power for the circuitry in the interface

B-003-007-006 Why are some transceivers capable of operating computer-based digital modes without a separate sound card?

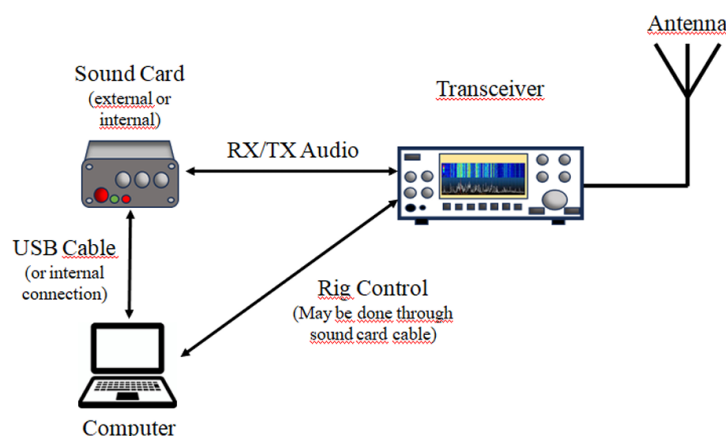
- a. Because they incorporate an audio codec
- b. Because they provide a USB connector
- c. Because digital signal processing (DSP) is built-in
- d. Because they support CAT (Computer Aided Transceiver)

In the realm of amateur radio, computer-based digital modes have revolutionized how operators communicate, enabling the transmission of data through modes like PSK31, FT8, and RTTY. These modes rely on a station setup that integrates computers and transceivers, often utilizing a digital-to-analog/analog-to-digital interface, generally a sound card interface to bridge the gap. The transceiver being the analog device and the computer the digital one.

Lets explores key aspects of sound card interfaces in such setups, addressing their function, the role of isolation transformers, why some transceivers bypass the need for a separate sound card, and the basic station components required for operating digital modes, as drawn from the Canadian Basic Amateur Radio Question Bank.

Function of the sound card interface

The sound card interface is a critical component in a station operating computer-based digital modes. Its primary function is to act as an intermediary between the computer and the amateur radio transceiver, facilitating the conversion of digital signals to analog audio signals and vice versa. When transmitting, the computer generates digital signals representing the data to be sent, which the sound card



Current Digital Modes reference diagram

interface converts into audio tones. These tones are fed into the transceiver's audio input (often the microphone or data port) for modulation and transmission over the airwaves.

Conversely, when receiving, the interface takes audio signals from the transceiver's output (such as the speaker or headphone jack) and converts them into digital data that the computer can decode using software like WSJT-X or fldigi. The interface ensures proper signal levels to prevent distortion, matches impedance between devices, and often includes controls for adjusting audio input and output. This seamless translation between digital and analog domains enables reliable communication in digital modes, which are prized for their efficiency and ability to operate under weak signal conditions.

Role of isolation transformers

Isolation transformers are frequently incorporated into sound card interfaces to mitigate issues arising from electrical connections between the computer and transceiver. Their primary purpose is to prevent ground loops, which occur when there are multiple ground paths between interconnected devices, leading to unwanted electrical noise or hum in the audio signals. This noise can degrade the quality of transmitted and received signals, introducing errors in digital communications. Isolation transformers work by

electrically separating the computer and transceiver, allowing audio signals to pass through while blocking direct current (DC) and unwanted low-frequency noise.

This is achieved through electromagnetic coupling within the transformer, which transfers the audio signal without a direct electrical connection. Additionally, isolation transformers protect both the computer and transceiver from potential voltage differences or surges, enhancing equipment safety and longevity. By maintaining clean audio signals, isolation transformers ensure high-quality digital mode performance, critical for modes like FT8, where precise signal decoding is essential.

Transceivers operating without a separate sound card

Some modern transceivers are designed to operate computer-based digital modes without requiring a separate sound card interface, thanks to integrated USB audio codecs. These transceivers feature built-in sound card functionality, allowing them to directly interface with a computer via a USB connection.

The internal audio codec handles the conversion of digital signals to audio for transmission and audio to digital for reception, effectively performing the role of an external sound card interface. This integration simplifies the station setup by reducing the need for additional hardware and cables, making it more convenient and cost-effective for operators. Additionally, these transceivers often include dedicated data ports optimized for digital modes, ensuring proper signal levels and impedance matching. One of these is the ICOM IC-7300 which has a separate column in this publication, but also the Yaesu FT-991A, and several others. These have become popular for their plug-and-play compatibility with digital mode software. However, the quality of the internal sound card can vary, and some operators may still prefer external interfaces for enhanced performance or flexibility.

Basic station components required

To operate computer-based digital modes, a station requires several essential components beyond the sound card interface.

- First, a transceiver capable of operating on the desired frequency bands and modes (typically SSB or FM for digital modes) is necessary. The transceiver must have audio input and output capabilities, either through traditional ports or a USB interface for newer models.
- Second, a computer running digital mode software, such as WSJT-X, fldigi, or Ham Radio Deluxe, is required to encode and decode the digital signals. The computer must have a sound card (internal or external) to process audio signals unless the transceiver has a built-in codec.
- Third, a sound card interface (if not integrated into the transceiver) is needed to connect the computer and transceiver, ensuring proper signal conversion and level matching. This interface may include isolation transformers for noise reduction.
- Fourth, a suitable antenna matched to the operating frequency is critical for effective signal transmission and reception.
- Finally, a power supply capable of meeting the transceiver's requirements is essential.

Optional components, such as a rig control interface (e.g., CAT control) for frequency and mode automation, can enhance functionality but are not strictly necessary for basic operation.

The integration of computer-based digital modes into amateur radio has opened new avenues for communication, leveraging the sound card interface as a pivotal component. By facilitating signal conversion, incorporating isolation transformers for noise reduction, and, in some cases, being supplanted by advanced transceivers with built-in codecs, the sound card interface plays a versatile role.

A basic station setup, comprising a transceiver, computer, interface, antenna, and power supply, enables operators to engage in digital modes effectively. Understanding these components and their functions, as outlined in the Canadian Basic Amateur Radio Question Bank, equips operators to build and maintain efficient digital mode stations, fostering reliable and innovative communication within the amateur radio community.

Continued on [page 90](#)



Study Aids

Some apps to assist your certification study

Are you studying for an amateur radio qualification? A recent [Lifehacker](#) article identifies several outstanding, free study applications designed to enhance organization, note-taking, memory retention, and overall productivity for any learner, moving beyond traditional study methods by leveraging technology as a tool for success rather than a distraction. Here are some of the suggestions and some of my own.

Highlighting the importance of structured studying, the article first recommends [My Study Life](#), an app that functions as a comprehensive scheduler, to-do list, and reminder system, ensuring students never miss an assignment or class, even accommodating classes that alternate weeks; a key feature is the inclusion of a focus timer that utilizes the popular [Pomodoro](#) technique to boost productivity, with the free version providing all the necessary scheduling functionality across iOS, Android, and desktop browsers.

For students whose learning style thrives on memorization and repetitive review, the venerable study tool [Quizlet](#) is suggested for its powerful flashcard creation capabilities, which allow users to customize study sets with notes, images, or audio, and engage with the material through practice tests, games, and various review modes; its massive database of publicly shared materials, uploaded by students over the years, also allows users to find pre-made resources for their courses, offering significant value in its free iteration.

For the challenge of capturing comprehensive lecture information, try [Otter.ai](#), a dictation and transcription program that automatically takes notes during lectures, recognizing different speakers and allowing users to highlight or edit the text post-session, a feature especially useful for long, detail-heavy presentations, with the free tier offering 300 minutes of transcription monthly and integrations with online meeting tools like Zoom and Google Meet, plus a recent update that generates a brief summary of the main topics to streamline review.

For the serious note-taker who requires an all-in-one organizational hub, [Notion](#) is presented as the superior choice, acting as a unified workspace for notes, ideas, schedules, and more; its most beneficial asset is the library of free pre-made templates, including assignment and finance trackers, which help students organize vast amounts of class information into structured notebooks and folders across all devices.

Furthermore, for learners who benefit from visualizing complex concepts, [Xmind](#) is recommended as a tool for quickly creating mind maps—hierarchical diagrams that visually connect related ideas and materials, a valuable technique for outlining study plans or understanding how different concepts interrelate—which provides ample free templates and basic functionality to accelerate the creation of these powerful visual study aids.

Another option, the **KWL chart**, is an effective study tool that enhances engagement and comprehension across all age groups, from

elementary students to graduate learners. It consists of three columns: Know, Want to Know, and Learn. This method encourages active participation in the learning process, aligning with constructivist teaching principles that emphasize the importance of interaction with material over passive absorption. To use a KWL chart, start by jotting down what you already know about a topic in the Know column. Next, in the Want to Know section, list questions or topics you wish to explore further, using subheadings or summaries from the material as guides. After engaging with the content—whether through reading, watching, or listening—record your insights and answers to your questions in the Learn column.

Begin a **KWL chart** at the start of an activity and complete the K and W columns. It's also useful for modelling how to create effective questions using either [Costa's Levels Of Questions](#) or [Bloom's question stems](#). Near the conclusion of the activity, the student completes the L column, reflecting on what was learned. This structured approach not only aids in retention but also fosters curiosity and deeper understanding. Once completed, revising your notes and employing techniques like flashcards or explaining concepts to others can further solidify your learning. The KWL chart is versatile, suitable for various contexts, including lectures, workshops, and even personal reading, making it a valuable tool for anyone looking to enhance their study sessions and maintain focus while learning.

Saving the best for last, [Google's NotebookLM](#) is my favorite, a free, highly effective AI resource that operates purely on materials the user uploads (such as PDFs, URLs, or text blocks), allowing students to interact with their source readings by asking the AI questions, which are answered with summaries and direct links back to the exact passage where the information was found; this unique capability turns sorting through extensive readings into a manageable task and includes innovative features like creating a conversational "podcast" from the content for auditory learners, alongside new additions for generating flashcards and quizzes, making it a game-changer for digital study and review.

I have created a sample Google NotebookLM session summarizing a year of [The Communicator](#), all six issues are included. Ask some questions and check out the links, especially the audio and video reviews in the right hand panel, it is Google AI generated, based on the files that I have inserted. I am currently revising our SARC course from the new Basic question bank. Once done I will be generating NotebookLM content for student use.

~ John VE7TI

Continued from page 88

So, our correct answers for the sample questions at the beginning of this article:

B-003-007-001 Which of the following is a function of the sound card interface in a station operating computer-based digital modes?

Answer: To convert the received analog audio signal from the transceiver into a digital signal for the computer

B-003-007-005 Why are isolation transformers often included in the sound card interface of a station operating computer-based digital modes?

Answer: To prevent the coupling of the transceiver and computer from introducing hum and interference into the transmitted signals

B-003-007-006 Why are some transceivers capable of operating computer-based digital modes without a separate sound card?

Answer: Because they incorporate an audio codec.

That's it for this issue, happy studying.

~ John VE7TI



No-ham Recipes

Meatloaf with sweet tomato-mustard sauce

by AUDREY WEST VE1PK

The sweet tomato-mustard sauce or the mushroom sauce is quick to assemble, as is the rest of the meat loaf. Then you just pop it into the oven and let it bake. Try this recipe when you have unexpected guests in the afternoon who look like they would like to stay for dinner! If you don't have a $\frac{1}{3}$ teaspoon (1.65 ml) measuring spoon, use a $\frac{1}{4}$ teaspoon (1.25 ml) measuring spoon, and round the seasoning into a little hump instead of levelling it off.

Preheat oven to 350F (180C or a very moderate oven)

Mix all ingredients together and place in a loaf pan. Make a inch (2.5 cm) deep and wide depression across the length of the meat loaf.

- 1 pound (450 grams) lean ground beef
- 5 slices sliced or unsliced bread, torn into small pieces
- $\frac{1}{3}$ teaspoon (1.65 ml) garlic salt
- $\frac{1}{3}$ teaspoon (1.65 ml) nutmeg
- 1 onion, finely chopped
- $\frac{1}{3}$ teaspoon (1.65 ml) salt
- $\frac{1}{3}$ teaspoon (1.65 ml) seasoning salt or Italian seasoning salt
- 1 cup (250 ml) milk
- 1 egg
- $\frac{1}{3}$ teaspoon (1.65 ml) nutmeg
- Dash of pepper
- $\frac{1}{3}$ teaspoon (1.65 ml) sage

Sweet Tomato-Mustard Sauce::

- $\frac{1}{2}$ cup (125 ml) brown sugar $\frac{1}{2}$ cup (125 ml) ketchup
- 1 tablespoon (15 ml) prepared mustard or Dijon mustard

Mix the brown sugar, ketchup and mustard, and pour over the top of the meat loaf. Bake for about $1\frac{1}{2}$ hours.

Mushroom Sauce Variation:

Instead of using the sweet tomato-mustard sauce, cook the meat loaf mixture for 45 minutes, then pour over it 1 can cream of mushroom soup and 1 can of mushrooms, drained. Bake for another 45 minutes, then serve.



November 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
						Coffee: 0700 Denny's King George Blvd. & 68 Avenue OTC Open 0930
2	3	4	5	6	7	8
1920: The first radio receivers sold		1930 SEPAR Net 2000 SARC Net 1916: Sarnoff proposes "radio music box" for radio reception	SARC General Zoom Meeting 1900-2100			Coffee: 0700 OTC Open 0930 Contest: WAE DX RTTY
9	10	11	12	13	14	15
Contest: WAE DX RTTY		1930 SEPAR Net 2000 SARC Net  REMEMBRANCE DAY Lest We Forget		1906: de Forest patents Audion tube	1911: Ernst Alexanderson granted US patent for the high-frequency alternator, a 100 kHz mechanical alternator	Coffee: 0700 OTC Open 0930 1899: Transatlantic Times receives first news by wireless
16	17	18	19	20	21	22
1904: Fleming patents thermionic tube (diode tube)		1930 SEPAR Net 2000 SARC Net	SARC Directors Meeting 1900-2100			Coffee: 0700 OTC Soldering Workshop 08:30-Noon 1899: Marconi Wireless Telegraph Company of America registered
23/30	24	25	26	27	28	29
30th: CQ WW DX Contest CW	1890: Edouard Branley coins the term "radioconductor"; the first use of the word "radio"			US Thanksgiving		Coffee: 0700 OTC Open 0930 CQ WW DX Contest CW



December 2025

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
	1995: FCC eliminates Restricted Radiotelephone Operator Permit requirement to operate a broadcast station	1930 SEPAR Net 2000 SARC Net				Coffee: 0700 Denny's King George Blvd. & 68 Avenue SARC/SEPAR Christmas Party OTC
7	8	9	10	11	12	13
1938: The St. Louis Dispatch begins a two-year experiment to deliver newspapers by radio facsimile, first transmission via W9XZY		1930 SEPAR Net 2000 SARC Net			1901: Marconi receives first trans-Atlantic wireless signal	Coffee: 0700 OTC Open 0930 ARRL 10m contest (CW/phone)
14	15	16	17	18	19	20
ARRL 10m contest (CW/phone) 1877: Ernst Werner von Siemens patents the first loudspeaker	1961: John Battison calls for Institute of Broadcast Engineers in Broadcast Engineering editorial	1930 SEPAR Net 2000 SARC Net 1925: Dynamic loudspeaker is designed by Chester Rice and Edward Kellogg	SARC Directors Meeting 1900-2100	1958: U.S. launches SCORE Sat transmits radio message from President Eisenhower, becoming the first communications satellite		Coffee: 0700 OTC Open 0930 RAC Winter Contest (CW/phone)
21	22	23	24	25	26	27
NARA NVIS Propagation Test 11:30 PST		1930 SEPAR Net 2000 SARC Net	1898: First ship-to-shore message sent 1906: Fessenden transmits first distant voice/music broadcast	Christmas Day 	Boxing Day	Coffee: 0700 OTC Open 0930 1947: Bell Labs invents transistor
28	29	30	31			
		1930 SEPAR Net 2000 SARC Net		Event details: SARC—SEPAR 'Live' calendar link All contest information: WA7BNM Contest Calendar: Home		

Radio-Active

Profiles of SARC members

Sheldon Friesen VE7SRF

presented by BLAKE R. WIGGS VA7BWG



Sheldon VE7SRF

"I don't need a base station—I can operate from anywhere."

Sheldon Friesen, VE7SRF, of Surrey, BC, came to amateur radio through a familiar path: early curiosity, a love of learning, and a fascination with long-distance communication. A full-time music educator and lifelong multi-instrumentalist, Sheldon has found in amateur radio—and especially CW QRP field operations—a way to stay connected not just to others, but to his own sense of discovery.

From Radios to Rhythm

Sheldon's interest in radio began with a Christmas gift: a crystal radio kit. He built it, ran a wire antenna outside and spent hours listening. He later found that in the evening his commercial AM radio receiver would pick up distant stations like WSM in Nashville, tuning in the Grand Ole Opry.

That early hands-on experience grew into a broader curiosity. He took apart broken radios to see how they worked, even fixing one by replacing a faulty resistor. The idea of becoming a Ham fascinated him. Sheldon earned his Basic license—with Morse code certification—before Canada dropped the CW requirement.



Instead of taking the easy route by deferring his exam to avoid the CW requirement, Sheldon threw himself into learning CW and took the exam while CW was still required because he wanted to operate CW. Shortly thereafter he completed the Advanced exam, gaining full operating privileges.

A Musical Life, On and Off the Air

When he's not operating portable CW, Sheldon teaches music five days a week. He had an early start: by age 16, he was giving banjo and accordion lessons. Though he no longer teaches accordion, his formal musical education—via The Royal Conservatory of Music—focused on the accordion.

Today, he offers both private lessons and children's group classes. "The private lessons are more advanced, while the children's classes focus on basic theory and performance," he says. His primary instruments are banjo, ukulele, and recorder, and he also teaches beginner guitar.

"I see about 400 children each week through my classes," Sheldon notes. "It's a full-time schedule, but I think it's the best job in the world."

Back on the Air—From the Park

After an extended period away from amateur radio, brought on by life changes and a move into a condo,

VE7SRF's Portable CW Station

Power Sources

- Anker 522 Portable Power Station
- Backup: Lithium powerpack with trigger cable

Antennas (Homebrew & Portable)

- 40m End-Fed Half-Wave (EFHW)
- 20m Linked EFHW
- 17-ft Telescopic Whip
- 19-ft Random Wire
- 71-ft Random Wire
- JPC-12 Portable Vertical

Deployment Configurations

- Sloper
- Inverted V
- Inverted L
- Vertical

Preferred Bands

- 20m - Daytime workhorse for POTA
- 40m - Evening fallback band

Operating Focus

- CW-only (QRP)
- Parks on the Air (POTA) - Year-round activity





Sheldon sold his gear and wasn't sure if he'd return to the hobby. That changed when he discovered Parks on the Air (POTA) which encourages portable ops from outdoor spaces.

"I didn't need a base station anymore," he says. "I could operate from anywhere."

Sheldon's first portable rig was a 3.5 watt QMX+ CW-only transceiver. Later he bought a Xiegu G90 and runs 20 watts, relying on portable wire

antennas he sets up in various field configurations. His primary power source is an Anker 522 portable power station, backed up by a lightweight lithium pack with a trigger cable.

Operating almost exclusively in CW, Sheldon focuses on 20 and 40 meters for park activations. "20 meters is my go-to during the day; 40m works well in the evenings," he says. He adapts his antenna choice and setup—slopers, inverted Vs, Ls, or verticals—based on terrain and propagation conditions.

CW as a Living Skill

A major draw of the hobby for Sheldon is the enduring value of Morse code. "It's encouraging to see CW growing again," he says. "There are more learning opportunities now than ever before—online clubs, video tutorials, virtual classes. It's a skill rooted in the history of radio, but it's still very much alive." You can even find YouTube videos featuring Sheldon engaged in CW QSOs; for example "QSO with my buddy Sheldon" posted by Forrest Stephenson, K17QCF of Spanish Fork, UT who Sheldon describes as "a CW junkie on YouTube".





That video (<https://www.youtube.com/watch?v=oOX1dBljzMs>) has racked up over 14,000 views since Forrest posted it on 9 September 2025. Also see https://www.youtube.com/shorts/TPio_2g6edY which has garnered almost 20,000 views since Forrest posted it on 23 May 2025.

Encouraging Community

Sheldon is an active SARC member and appreciates the club's supportive environment. "It's a group that really encourages one another. It's a good place for anyone looking to grow in the hobby."

When asked what advice he'd give new operators, he's clear: "The hobby is broad—find the part that interests you and focus on getting good at it. Take on challenges, keep learning, and don't give up easily."

For Sheldon, amateur radio—like music—isn't about mastering everything. It's about engaging deeply, developing skill, and enjoying the process.

~ Blake VA7BWG



Ex SARC Member donates digital nautical archive

John MacFarlane VA7PX, a former SARC member, now a Qualicum Beach resident with a lifelong passion for maritime history, has donated his monumental digital archive, Nauticapedia, to the Maritime Museum of B.C. Spanning over 50 years of research, the resource includes databases of more than 95,000 vessels, 14,000 shipwrecks, and 60,000 mariner biographies, plus 12,000 archival photos and 35,000 ship plans. Attracting four million annual hits from 130 countries, it will remain a separate website with links to the museum, ensuring public access.

John is a former museum director (1989-1993), Parks Canada employee, and author of 15 nautical books, calls Nauticapedia his "magnificent obsession" and "accidental project," begun in 2000. He credits thousands of contributors for its depth, emphasizing B.C.'s rich maritime stories—from pirates to technological triumphs.

The museum, hailing it as its most significant gift in 70 years, is enhancing the site with University of Victoria computer scientists, adding a user-friendly dashboard and a heritage-vessel registry. Annual operating costs are estimated at \$50,000. Sponsors include Robert Allan Ltd. and Philbrooks Boatyard; public donations are welcomed via mmbc.kindful.com. John, named curator emeritus in 1994, will continue researching as a full-time volunteer. He celebrates figures like Capt. Edward Orde, whose colorful glass eyes amused and unnerved guests, asserting that B.C.'s maritime tales rival Hollywood's best. The donation secures Nauticapedia's future as a global research cornerstone.

John has [written](#) for The Communicator several times in past years.

~ John VE7TI

The Contest Contender



Worked All Europe

All modes Dx contest

by DOUG JEFFREY VA7JDJ



Doug Jeffrey VA7JDJ
reporting on SARC's
contesting efforts

On the weekend of September 13th SARC mustered a team to participate in this challenging contest. The Worked All Europe (WAE) contest is acknowledged as one of the more difficult contests of the year. The challenge rises from the rules which allow operation on 80m, 40m, 20m, 15m and 10m. Stations are required to exchange their callsign, signal report and a serial number that increments with each contact that has been logged. Points are awarded for contacts with these European callsign prefixes:

1AØ, 3A, 4O, 4U1I, 4U1V, 9A, 9H, C3, CT, CU, DL, E7, EA, EA6, EI, ER, ES, EU, F, G, GD, GI, GJ, GM, GM/s, GU, GW, HA, HB, HBØ, HV, I, IS, IT (without IG9/IH9 Zone 33), JW, JW/b,

JX, LA, LX, LY, LZ, OE, OH, OHØ, OJØ, OK, OM, ON, OY, OZ, PA, R1F, RA, RA2, S5, SM, SP, SV, SV/A, SV5, SV9, T7, TA1, TF, TK, UR, YL, YO, YU, Z6, Z3, ZA, ZB

Multipliers are awarded for working the same country on different frequencies. This is weighted with 80m multipliers x4, 40m multipliers x3 and the remaining bands x2.

In this contest another opportunity to score points is through the use of QTC traffic. To secure these extra points a DX stations need to exchange information about previous contacts with a European station. Successfully exchanging the time of the contact, callsign of the station and serial number of that contact counts as an additional point for both stations. A



maximum of 10 QTC exchanges can be scored between any two stations. Each contact in the station's log can only be used for QTC one time.

Our new contest manager Mike VE7YEG prepared the club's station. The plan was to use the Icom 7610 to drive the Expert Linear Amplifier. Our brand new Momobeam Penta10 antenna was in place to cover 10m, 15m & 20m. The longwire would be used for 40m & 80m. We would operate as a multi operator high power station. Mike scheduled the team who was made up of: Mike VE7YEG, Scott VE7KAT, Stan VE7NF, Erika VA7ISI, Doug VA7JDJ, Steve VE7SXM, Johnny VE7UJM, Michelle VE7QMC, Jeanne VA7QD, Karl VA7QCK, Barb VA7FDP, and Andrew VA7LGN.

With all the rules, equipment and people in place we were ready for the contest to begin. As always we watched the propagation conditions leading up to the contest. On the Thursday before the contest we were disappointed to read reports of an X1 solar flare. Knowing that this contest is always challenging we knew that this would lead to adverse conditions, but we were committed to participating and we continued with our plans.

The effects of the solar weather were felt immediately when we started operating. Most operators reported difficult conditions with poor reception. For the few stations that were being heard many calls simply went unanswered. By the close of the contest we had accumulated a mere 40 contacts. Great perseverance was shown by all operators continuing to try and make QSOs in these extremely challenging conditions. The slower rate of calls did give us the opportunity to have a few new to contesting hams sit in the chair and try their hand at contesting. Hopefully we will see them out again at a more lively contest soon!

At the end of the contest we had only accrued a total of 40 QSOs, all on the 20m band. While the results were not great everyone who participated had fun. Thank you to all who came out.

~ Doug VA7JDJ

The CQ WW SSB contest

The contest took place over the weekend of Oct. 24-25. Conditions were perfect, specifically on the 10 meter band, for what might be the most popular contest of the year. Eleven members of SARC participated as a team, making 1459 contacts, for a total score of 790,560.

Congratulations to Kapila VE7KGK for single-handedly bringing in 348 contacts. Both radios operated without any problems although operators did not have access to keyboard shortcuts within the N1MM+ software. This was partially overcome by using the [built-in memory transmit feature](#) of the IC-7610. Initial feedback was that everyone had a great time, including those that had to come in during the wee hours of the morning.

~

I just wanted to say how amazing this contest was! I managed to make 18 contacts (I hope Jeanne will be proud of me!! the only woman on the team), and it was truly a fantastic experience. The energy, teamwork, and coordination we had made the event even more special. Stan helped me with the call sign and instructions.

Congratulations to all of you , we did an excellent job! Every call, every log, and every moment on the air counted. I'm proud to be part of this team and can't wait for the next contest together.

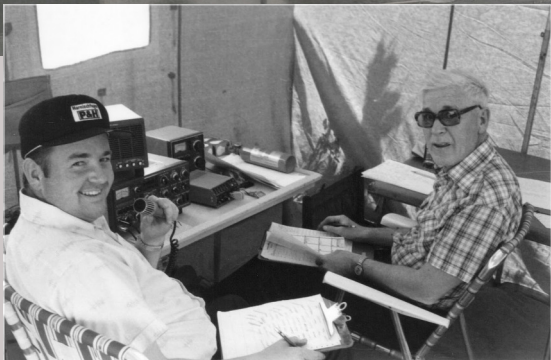
73,

Erika Isabel Natarajan VA7ISI

SARC 50th Anniversary

And the transformative role of the
Surrey Amateur Radio Club
in my ham radio journey

from the meeting presentation by FRED ORSETTI VE7IO



Centre photo: One of SARC's first Field Days. Left is Carry Miller VE7CFC with Doug Moore VE7CBM on the right.

Bottom photo: SARC members visit and operate in the UK. Fred Orsetti VE7IO on the left and centre background is Ralph Webb VE7OM.

My journey in amateur radio, spanning over five decades, has been profoundly shaped by my involvement with the Surrey Amateur Radio Club (SARC), a community that provided me with knowledge, camaraderie, and inspiration. When I first joined SARC, I was a newly licensed ham, eager but inexperienced. The club became a cornerstone of my growth in the hobby, introducing me to seasoned operators like Doug Moore VE7CBM, the club president and an electronics teacher; Mike Hawley VE7AVM, an electrical engineer at BC Hydro; and Max Green VE7DZ, who ran a repair shop in White Rock and later taught club classes. These mentors, along with others, shared their expertise and passion, guiding me through the intricacies of amateur radio. The club's monthly meetings, which began with enthusiasm and evolved over time, offered a platform for learning and collaboration.

A separate technical meeting each month allowed us to dive into hands-on projects, such as converting CB radios to operate on the 10-meter band, which sparked significant interest among members. Most members of the Surrey Club had converted 10 meter radios, and as a result, we started a Sunday evening net that worked out really well. This project led to the formation of the Dogwood Chapter of 10-10 International, a prestigious recognition that required logging a specific number of QSOs. The sense of achievement from soldering circuits, mastering on-air communication, and earning this distinction fueled my passion for the hobby and underscored the value of community-driven learning.



One of the most memorable milestones in my SARC experience was the club's first Field Day in 1976, held on seven acres of my property in White Rock. As a novice, I had little understanding of what Field Day entailed, but the event became a defining moment. Doug Moore and his electronics class arrived at my property on Friday, stringing wires through 50-foot trees to set up antennas for 80, 40, 20, and 10 meters. The event kicked off Saturday at 11 a.m., but not without challenges: the generator failed by Saturday night, forcing us to scramble for a replacement to power our 110-volt radios. Transceivers were not 12 volts in those days, and a couple of radios malfunctioned. On Sunday, an amusing incident occurred when my wife reported the doorbell ringing incessantly, caused by interference from a 10-meter sideband antenna operated by Terry Miller a VE7, now a silent key. These early mishaps taught me invaluable lessons about troubleshooting and resilience, reinforcing the hands-on nature of the hobby.

In subsequent years, SARC held Field Days at McKee Mountain (nicknamed "Monkey Mountain") near Abbotsford, a Forestry repeater site accessible only by a rugged four-wheel drive road. The remote location created a captive audience, you stayed there for the weekend, unless somebody was willing to drive you down on a four-wheel drive vehicle. These events fostered camaraderie and focus. During these years, as in many years since, SARC took first place in Canada for Field Day, relying on paper logging, manual dupe sheets, and weeks of post-event tallying. These experiences highlighted the club's dedication and the thrill of collective achievement, even without modern tools like computers.

The Surrey Amateur Radio Club also facilitated unique opportunities for international connection. In 1984, inspired by Ralph Webb VE7OM and his contact Ron McDonald in the UK, a group of SARC members traveled to London to operate from BC House, hosted by the Sutton and Cheam Amateur Radio Club in Surrey, England, just west of London. The connection between Surrey, BC, and Surrey, England, fostered a meaningful exchange, with two weeks of

operating, socializing, and building lasting relationships. Some UK hams later visited us in British Columbia, including one who stayed with me for a week. This trip exemplified the global spirit of amateur radio, made possible by SARC's initiative and vision.

However, the club faced challenges in the 1980s and early 1990s, a period when work limited my participation. By 1995, SARC had dwindled to just six members and finances were tight and we had problems keeping things solvent. At a meeting held at Manawis Senior Secondary, we were facing restrictions from the facility and contemplating dissolution. Our repeater was located at Horizon's Care Home around that time. The club's equipment, including a tower and a repeater, was at risk, and the repeater and its frequency pair was eventually donated to the Delta club by an influential member who was disillusioned with SARC. We even had negotiations with the Langley Club and talked about merging with them to try and build some synergy with that group, but that never happened. But that was how bad it was at that time.

Fortunately, new members stepped in, revitalizing SARC with fresh energy and leadership. Their efforts rebuilt the club into the vibrant organization it is today, with a strong executive team maintaining financial stability and a broad scope of activities.

Reflecting on SARC's evolution, I'm struck by how far the club has come since its early days in 1975, when CW, Field Day, and hands-on projects were the focus. Today, SARC engages in a wide range of activities, from public service events to contesting, which it excels at under skilled leadership. The club's adoption of modern technologies, like software-defined radios (SDRs), contrasts with the bulky 110-volt tube radios we used in the beginning, yet it has maintained a commitment to sharing knowledge and fostering community. Compared to other clubs, like the Burnaby Amateur Radio Club, which struggled and never fully recovered,

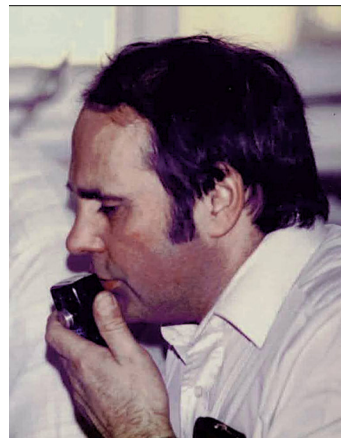




SARC's resilience is remarkable. The SARC's recovery from near dissolution to its current strength is a testament to its dedicated members and leadership.

For me, amateur radio remains magical—whether it's a 50-watt QSO to Europe with a simple wire POTA antenna or the camaraderie of a Field Day. To new hams, I encourage listening to experienced operators and embracing the hobby's challenges and joys. The Surrey Amateur Radio Club gave me the foundation to grow, learn, and find joy in this hobby, and its legacy continues to inspire both members and the wider community.

~ Fred VE7IO



Peter Vogel VE7AFV: A Profile in Tech, Science, and Amateur Radio

Peter Vogel VE7AFV, is a retired high school teacher from Vancouver, British Columbia, Canada, whose career spanned information and communications technology (ICT) and physics education. He remains active reporting on the annual [Balsa Bridge competition](#) at his former high school. With over three decades in the classroom, he inspired students through hands-on experiments and real-world applications of science, earning accolades including Prime Minister's and Premier's Science and Technology Awards for innovative teaching.

We were fortunate to have Peter visit SARC for a second time at our 50th Anniversary meeting on October 8. Peter spoke of his history in the many facets of our hobby. An interesting bit of trivia was that Peter first broke the story of missing flight [KAL007](#). He was sought out by media as the story unfolded. Radio station CFUN later paid him \$1000 for the 1983 news story tip of the year.

His approach emphasized inquiry-based learning, blending traditional physics with emerging tech like coding and digital simulations. Post-retirement, Peter has evolved into a prolific tech journalist and communicator, contributing to outlets on topics ranging from artificial intelligence and cybersecurity to meteorology and astronomy.

His writing demystifies complex subjects, often drawing from personal experiments—such as tracking solar flares' impact on radio propagation or analyzing AI ethics. A CERN alumnus and Hubble Space Telescope (HST) contributor, he has participated in international collaborations, including data analysis for cosmic observations.

VE7AFV is a beacon of activity. Operating from grid square CN89, his station is a hub for advanced digital modes. He's renowned for intercepting signals from the International Space Station (ISS) APRS digipeater on 145.825 MHz, frequently serving as North America's first iGate after Pacific crossings. Using software-defined radios (SDRs) like Nooelec NESDR, and Direwolf for decoding, he captures packets from balloons, WSPR beacons, and SSTV transmissions.

His X ([@PeterVogel](#)) feed, with 12,000+ followers, chronicles these pursuits, fostering global ham communities. Beyond radio, Peter's interests in ADS-B aircraft tracking and space weather underscore his amateur radio activities.

As a bonus, Peter donated several Nooelec SDR kits and a Baofeng transceiver to newer hams at the meeting.

~

Peter maintains website at <https://petervogel.ca/>



SARC News



New MOMO Beam PETA 10 HF Antenna Installed at the OTC

Surrey Amateur Radio Communications is excited to announce the purchase and successful installation of our newest addition—the MOMO Beam PETA 10 5 Band HF antenna!

This state-of-the-art HF beam has been installed on our Grey Tower, significantly enhancing our station's capabilities. The MOMO Beam PETA 10 HF offers improved signal clarity, exceptional directionality, and broader coverage, with the addition of 12m and 18m bands, ensuring outstanding performance for all HF communications. We are delighted to confirm that the new antenna is operating as expected, delivering excellent results since its activation.

We would like to extend our deepest gratitude to all those who contributed their time, expertise, and effort to the assembly and installation of the antenna. Your dedication and teamwork have made this upgrade possible, and have greatly improved the station for the benefit of all members.

Let's make the most of this exciting new asset as we look forward to many successful QSOs and enhanced communication opportunities.

Thank you all for your continued support and contributions!

~ Surrey Amateur Radio Communications Board of Directors

Passing of Dr. Maurice Brook

Some of you may have heard, or if you were fortunate, spoken to Dr. Brook on air during our Manna @ 80 special event this past May/June. We're sad to report his passing at age 100.

Dr. Brook grew up Rothwell in Yorkshire, joined the Air Training Corps, and then joined the Royal Air Force at the age of 18, after spending time with Cambridge University Air Squadron. He completed his pilot training in Canada before going to the Advanced Flying Training unit in RAF Millom, Cumberland. Meeting up with his crew in RAF Husbands, Bosworth

there were several several incidents with his pilot and his training on Halifaxes. He was then posted to RAF Sturgate, flying in Halifaxes and collecting a new pilot, who managed to land the aircraft after a tire burst. Maurice was subsequently posted to 625 Squadron at RAF Kelstern, flying Lancasters, and told of some of his operations and his memories of the losses of other aircraft. His experiences included an operation to Nordhausen, where they were to bomb a V-2 rocket site.



Maurice completed 15 operations, including a mine laying operation to Kiel Harbour and the oil refineries at Plauen, and he tells how he used his astro-navigation training after losing power to his radar. He took part in Operation Manna, dropping food supplies over the western Netherlands in the closing days of World War II.

After the war, Maurice went to university where he studied Biological Studies and then got a job with Boots Company in Nottingham, undertaking agricultural and horticultural research. He went on to join the Beecham Group, where he held the position of Director of Research of the Consumer Products Group. Some of his experiences are detailed in an interview available [HERE](#) online.

His presence made the Manna event unique and unforgettable.

RIP Flight Officer Brook, you are not forgotten, Blue Skies.

~



September 2025



SARC General Meeting minutes

September 10, 2025

Recording Secretary MIKE PORISKYVA7YEG

Attendance: 23 members/guests attended (refer to sign-in sheet)

Start Time: 19:02 hrs. Sept. 10, 2025

Location: Fire Training Center - 14923 64 Ave

Welcome & Presentation of Agenda - Steve called the meeting to order and gave a brief welcome message. His introduction included the message that Dave Cameron had to cancel his presentation tonight, so only the business meeting will take place.

Business Meeting

1. Announcements:

- The previous in-person meeting was SARC's Annual General Meeting which took place on June 11, 2025. At this meeting, Director positions were filled. At the first executive meeting following the AGM, the Directors assigned board positions as follows, which will remain in effect for the next 12 months:

President: Steve McLean

Vice President: John Brodie

Treasurer: Scott Hawrelak

Secretary: Mike Porisky

- Shawn D. (VE7BD) asked whether there are any term limits to which Steve replied that members can run for executive positions as often as they wish.
- Steve reminded everyone that this year is SARC's 50th anniversary of the first general meeting. This occasion will be celebrated during the October General Meeting.

2. Committee Reports:

Financial Report - Presented by Scott H.

- Profit & Loss statement was presented showing an expense for the new antenna of approximately \$3000. The amount shown under meeting Expenses was higher than usual because of Field Day operations at the end of June.
- Scott reporting on the balance sheet, chequing account, and GIC confirmed that the books were currently up to date and there were no debts owing; he offered all members an opportunity to view the financial information.

Nets - Reg VA7ZEB

- All nets are going well. The SARC net was especially good this week but the 200 and UHF net are not as popular. Adrian M (VA7YEP) connected over IRLP from Windsor, which worked well. The 220 net, which was previously on the last Sunday of the month will be moving to the last Thursday.

**SEPAR/OTC - Gord K.**

- The Flex radio was removed from Firehall No. 1 and returned to the OTC, due to the lack of internet reception. Gord spoke to Jason at the firehall and will follow up to learn more about internet availability.
- The new beam antenna was installed and it is working very well.
- Reg N. installed 2 computers in the common area at the OTC for all members to use.
- Routine maintenance was performed last Saturday, including the removal of branches that were leaning on the building, patching holes to prevent rodent entry and fixing the damaged areas of the fascia on the back and sides of the OTC building.
- Gord is still planning to meet with Surrey Police regarding a follow-up to the Run-Surrey-Run event.
- Steve, John B. and Gord are still working with the City of Surrey and SFSAR regarding a lease/license.
- Anton asked what changes were being considered and Steve gave a brief description of the room that we would like to acquire for the purpose of radio testing, etc..

Membership - John B.

- The count of paid members is down to 145; a loss of approximately 20 following the renewal period. This number should continue to grow through the year.
- Steve explained the differences between an honorary member and a life-time member award. The motion made last month was amended, based on the new understanding of terms, to recognize and award the following members: The motion was seconded by Andrew E. and was carried.

Honorary: Ralph Webb, Jinty Reid

Lifetime : Ken Clarke, Fred Orsetti, Heinz Buhrig, Fred Reichstein

Contests – Mike P.

- Mike gave a review of the 'Worked all Europe' contest that will be starting this weekend. Currently there are 14 operators who have

signed up. Others were invited to join the team by sending an email to contests@ve7sar.net.

Repeaters

- All repeaters are operating normally. The Concord repeater did go down temporarily - but cause was unknown.

AREDN - Doug J.

- Doug presented a detailed overview of SARC's involvement with installation of AREDN at the Concord repeater site. The hardware was supplied by Chris Anton and is standard commercial equipment.
- Doug explained that the Island AREDN group has a node on Mt. Benson and SARC is attempting to connect with the mesh using hardware mounted at our repeater site. It seems that the distance involved is pushing the maximum limit so reliability is less than optimum. The connection network was displayed on a map depicting a various connection methods.
- Doug covered SARC's installation and testing process that the team went through as well as future plans to resolve the connection problems. The current state of the program is that the hardware is installed but still pending firmware upgrades.
- Question: Stan asked what the power level of the transmitter was? Doug replied that the current setting is approximately 1.5 watts (a limit of the hardware) but that cap can be removed with a firmware update, resulting in twice the power output.
- Question: Shawn asked what can be done with an AREDN node. Doug explained the many benefits of AREDN including emergency services, internet without encryption, video monitoring, remote management, etc.
- Reg expressed his satisfaction with the way the AREDN was being built legally, following Amateur Radio regulations.
- Question: Andrew asked what happens when the internet goes down and whether it would impact the overall network. Doug explained that as the network grows, there is less dependency on having to use the internet for peer-to-peer communications. The goal is to mount sector antennas so that any member of the public (with the right hardware) can



connect to the network and reach a station for emergency services.

- Gord explained how this technology was used to install a phone system at a kids camp last summer. He added that once the technology is proven, more options can be added.
- Question: Scott H. asked why the Island was more active. No answer was provided. Other questions asked and answered were given for Anton's question - whether we considered a larger dish; and Andrew's question about using different band options. To both questions, Doug explained that we have to use the hardware that we already have. Lastly, Andrew asked what the range of sector antennas is and Doug stated "about 50 kilometers".

Run-Surrey-Run Summary - John S.

The race was completed this week and John S. gave a debrief of the event:

- Over 900 participants took place as either runners or walkers.
- Initial feedback indicated another successful year.
- SARC had 20 volunteers; 13 around the course and 6 in other positions.
- Great job by Andrew (VA7LGN) performing Net Control duties
- Other key positions included Gord (VA7GK) & Jeanne (VA7QD) at the Emergency Operations Center, Rob C. (VE7CZV) recording the log file, Paulette (VA7PMS) bridged radio communications while John S. (VE7TI) and Doug (VA7JDJ) performed coordination tasks.
- There was a problem with batteries and wrong frequency settings with the selected commercial radios but no reported issues with SARC operators. The organizers are already planning for next year.
- The relationship between police services and the organizers was better than previous years.
- Gord (assigned to EOC) restated that there was a channel problem with radios assigned to the traffic control group. Also, traffic did not have enough cones or security tape.
- The plan was to have traffic re-opened in a staged progression, but that was cancelled due to safety concerns.

- Multiple radios had to be delivered to the EOC to enable communications between the organizers and police services. The organizers had their own cyclists, but due to radio problems, they had to receive information from SARC cyclists.

3. Old Business:

- **New Antenna** - Steve M. The new beam antenna was installed and is working very well. SWR on all bands looks great. The installation was easy and with no traps, the antenna should be maintenance free. Anton asked what the plans were for the old antenna. John B. stated that it will be put in storage for now.
- **Bigfoot Antenna Cable Replacement** - Steve is working with the local company Westower, in Cloverdale, to order and install the cable. Estimated delivery time is 10-12 weeks. Shawn D. asked if this was something that we could do ourselves. Steve explained that the liability was too great and that a professional installation was required to be covered by our insurance.
- **Delta Swap Meet** will take place on Sunday, October 5th. SARC will have 1 table.
- **The CW Course**, instructed by Stan W. will begin on Tuesday. Currently there are 2 participants enrolled.
- **Winter foxhunting event** - Andrew E. is considering organizing. Anyone interested should contact Andrew
- **POTA** - Reg N. is interested in organizing a POTA event for SARC members. The purpose is to introduce amateur radio to the public. Reg will send out more information and notify members during upcoming nets but these events will only take place if the weather is good. No permits are required if specific rules are followed.

4. Adjournment

Steve moved to adjourn the meeting, seconded by Scott Thomas. (VE7KAT). Carried. The September meeting adjourned at 20:25 hours.

~

October
2025



SARC General Meeting minutes

October 8, 2025

Recording Secretary MIKE PORISKYVA7YEG

Attendance: 30+ members/guests attended (refer to sign-in sheet)

Start Time: 19:00 hrs. Oct. 8, 2025

Location: Fire Training Ctr. – 14923 64 Ave

Presentation

Steve gave a brief welcome message.

- This meeting was in celebration of SARC's 50th year in operation.
- The meeting began with a presentation from Peter Vogel VE7AFV regarding his experiences monitoring satellites and weather. Peter provided gifts for many of those present and presented SDR kits and a new Baofeng portable to several newer SARC members. (See the follow-up article on [page 102](#)).
- This was followed by the recollections of Fred Orsetti VE7IO, a founding member of SARC. Fred spoke about the [club's history](#) and evolution while a slideshow of club photos played in the background.

- During the break, refreshments and anniversary cake was enjoyed by those present.

Business Meeting

Due to limited time, the business meeting was brief.

1. Reports

Financial Report

- Scott VE7HA reviewed the P&L Statement and Balance sheet.

Nets

- Reg VA7ZEB advised nets have been going well, however the UHF net could use more participation.

Contests

- Steve VA7SXM reviewed past and upcoming contests. He noted that the recent WAE Contest was characterized by poor propagation.



Membership

John VA7XB reported that current membership is 145. He also noted that several visitors were present to celebrate the Society's anniversary but time was insufficient to acknowledge each individually.

Classes

John Schouten VE7TI - advised that, after a complete review and amendments due to the Basic question bank revisions, the next ham class will start on January 26.

2. Old Business

- The Delta swap meet raised \$320 for SARC.
- Big foot repairs will be underway soon.
- John Schouten VE7TI provided a project update for a ham radio data hotspot, with a show of hands indicating significant interest.
- Gord Kirk VA7GK presented information about Winlink and VARA. Licenses for VARA will be looked at as a group buy (roughly \$85 CAD). More information will be made available.

- Gord also reminded everyone about the upcoming BC Shakeout event scheduled for 10:16 AM on Oct 16, 2025. Members are asked to check in on the VE7RSC repeater and provide an "exercise" report, which will then be provided to the city. Doug VA7JDJ asked about Winlink for this event. Gord explained the use of the "Did you feel it" form that can be submitted via Winlink and should also be sent to SEPAR@winlink.com. See Gord's full report starting on [page 110](#).

3. New Business

None.

4. Announcements

Reminder of McDonald's following the meeting.

5. Adjournment

Steve VE7SXM moved to adjourn the meeting at 20:55 hr. seconded by Anton VE7SSD. Carried.

~



*Photos from the October anniversary meeting:
Above presenter Peter Vogel VE7AFV,
right is Fred Orsetti VE7IO reviewing
SARC's first 50 years.*

*Below meeting attendees pose with
the anniversary cake.*



SURREY AMATEUR RADIO basiccourse

OBTAIN YOUR FEDERAL AMATEUR RADIO CERTIFICATE

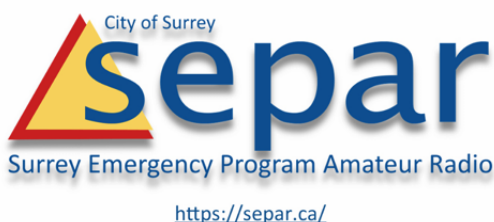
7-WEEKS · ON-LINE · \$80

Next course starts Monday, January 26 — contact sarc@ve7sar.net

Includes classes, a comprehensive manual, videos and the exam fee



- Ideal for outdoors activities. Long range communications anywhere for free without commercial infrastructure
- Use satellite communication to speak around the world, perhaps even to an astronaut
- Participate in 'Radio Sports' like Contesting and Hidden Transmitter Hunts
- Enhance your personal and your community's preparedness in an emergency
- Use a radio, computer, smartphone or tablet for free worldwide digital communications
- Practice an exciting hobby or start a career opportunity





The SEPAR Report

by GORD KIRK VA7GK



Gord Kirk VA7GK
is a SARC Director
and the City of Surrey
SEPAR Coordinator

September and October have been busy months for SEPAR. At the beginning of September, we started off with the **Run Surrey Run 5/10Km** race. The Race was held on Sunday September 7th This year was the first year to have the streets completely closed to vehicular traffic. The race is growing every year and trying out different things to help improve the management of the event. This year the race organizer brought in commercial radios for the organizer and his staff, as well as their own bike observers with commercial radios. Previously SEPAR had provided amateur radio volunteers on bikes.

The plan was to provide a commercial bike radio and event management radio to the SEPAR trailer (running the event communications). A set of these would also be provided to the EOC with the amateur communications liaison station. Prior to the event day we did not know what these

commercial radios would be, if a repeater was involved, and if they had been tested for coverage around the course.

SEPAR had 21 volunteers posted around the race course, in the communications trailer, EOC, two on bicycles and at the Start/Finish area. Set up was quickly completed in the park and EOC. The extra event radios were delivered to SEPAR and tested. The commercial radios did work outside and Paulette VE7VPE acted as the liaison juggling three radios and the phone for SEPAR. The event radios did not work within the EOC building. We could at times hear a communication but most were unreadable. With this failure the EOC relied on all race communications through SEPAR net control (Andrew VA7LGN).

Within the EOC the city has Police and Traffic management to oversee deployment of officers and management of issues related to the



race. The police also work together with the traffic management staff to ensure roads are closed and monitored.

Prior to the race the contracted traffic management company's radio system had some challenges which led to delays in road closures. It also delayed the race start. After some investigation the problem was identified. To fix the problem the traffic management staff needed to move to another channel on their radios. This was taking some time as each intersection on the course had personnel which needed to be contacted. SEPAR stepped up and a broadcast to our team was made. This broadcast asked SEPAR operators to contact any nearby traffic



staff and have them switch to the identified channel and check in with their dispatch. Our two SEPAR bike riders started a lap around the course passing this message along. Once this was done and the traffic closures were confirmed, the race started, albeit late.

The runners began and the first runners were followed around the course with the radios being used to pass the location to the race organizers. The full 10km race was two laps around the course and as the 10km runners caught up to the 5km runners the course became very busy. Shuttle drivers were contacted to bring water and other items to the support stations around the course. Towards the end of the race, finding the last runner/walker was important to help with reopening roads, ensuring everyone was now off the roads.

During the event we did have one injury, a fall with minor injuries (one of our volunteers), we had a small fire in the park near the finish line, and had some angry residents that wanted to use the closed roads prior to them being

opened. Each one of these was relayed and dealt with using the assistance of the SEPAR radio team.

When the event ended, the equipment was taken down and most of the SEPAR team met at a local restaurant to chat and debrief. Overall, it was another successful event showing the use of amateur radio and also showing how we have good radio coverage in a dense part of our city. The other agencies and city staff in the EOC saw how useful the cities' volunteer radio operators are.

THANK YOU

to all the Participants and our Sponsors!



Feedback that we have identified from this event, for next year, is the value the amateur operators with bikes are to the event. We will try and increase the number of bikes in future years.

The other lesson learned was as a result of the issue the Traffic

Management group had with their radios. Their commercial portable radios in the field only had channels 1-16 on the knob without any alpha numeric display. The EOC mobile radio being used had an alpha numeric display and names for the channels without numbers. This helped create the one of the issues they experienced.

Learning from their experience SEPAR created a new simple channel naming and numbering plan.

New SEPAR Short List Frequency Plan

Horace VA7XHB is one of our very busy members who helps with support the SARC Repeaters, Winlink Gateways and assists with programming radios to anyone who asks on Saturday morning. For some time, we have discussed a radio programming plan. We do have an agreed upon frequency plan within each municipality identifying primary and secondary repeaters, and simplex with both VHF and UHF identified. This frequency list is what the Province and Volunteer Emergency Radio groups will use during a disaster.



Some radios only have frequency display, some have alpha numeric, some radios are single band and other multiband radios. With the SEPAR program radios we can control the layout while the volunteers manage their own radios. They also have their own favorite repeaters and way in which they operate. So rather than create a big plan Horace had a very creative idea.

SEPAR now has a SHORT LIST FREQUENCY PLAN

Our webpage (<https://www.ve7sar.net/separ/frequencies>) explains it well:

SEPAR maintains a short list of frequencies for those in the Surrey area to use. This list has deliberately been kept to just nine entries which cover the primary frequencies used by amateur radio operators in the Surrey area. By limiting the size, we allow radio operators to assign any block of 10 memory slots and then refer to them by channel number, without disrupting their existing frequency list. These blocks could be frequencies 1-9, or 541-549. For example, Channel 2 (VE7RSC VHF South) could be Frequency 2 or frequency 542 if your SEPAR block starts at 1 or 541, respectively. We request that amateur radio operators in the Surrey area reserve any block of 10 memory slots and assign these frequencies to them for use in emergencies."

If your radio doesn't have the 440Mhz or 220Mhz bands available in it leave those channels as blank/not used the number order. For clarification: In the list below if you don't have 220 then channels 4 and 9 would read not used/blank.

Ch	Rx	Tx	Offset	Name	Tone	Comment
1	147.36	147.96	+ 600 kHz	RSC N	110.9 Hz	SARC/SEPAR. Nets are held Tuesdays at 19:30 and 20:00. Echolink 496228.
2	147.36	147.96	+ 600 kHz	RSC S	103.5 Hz	SARC/SEPAR. Secondary repeater with South Surrey Coverage. No Echolink.
3	443.775	448.775	+ 5 MHz	RSC U	110.9 Hz	SARC/SEPAR. Supports both FM and C4FM. Not linked to the VE7RSC VHF repeater.
4	223.96	222.36	+ 1.6 MHz	RSC220	110.9 Hz	SARC/SEPAR. 220 MHz repeater on Concord Tower in Whalley. Not linked
5	146.55	146.55		146.55		SEPAR VHF Primary Simplex Frequency
6	147.42	147.42		147.42		SEPAR VHF Secondary Simplex Frequency
7	446.55	446.55		446.55		SEPAR UHF Primary Simplex Frequency
8	447.425	447.425		447425		SEPAR UHF Secondary Simplex Frequency
9	223.52	223.52		223.52		SEPAR 220 Band Simplex Frequency

Using the naming format shown in the table allows those with limited alpha-numeric size limit to also use the same name, as the maximum name size is just 6 characters.

This plan ensures that we can clearly communicate by both channel number and name where we are operating. If we need to move to another channel for any reason, it can be clearly identified and easily moved to. Most modern radios have large memory storage capabilities so we hope this is not a big ask for SEPAR volunteers.

The Great Shakeout Exercise

The other recent big event was the annual Great Shakeout. This is held the third Thursday of October. This year Oct 16 at 10:16 we "had a large earthquake". The community at schools, workplaces practices "Drop! Cover! Hold On!" (<https://www.shakeoutbc.ca/>)

For SEPAR this meant after 10:16 a net would be started on the local repeater. This is part of the standing message in our weekly net script:

After an emergency or disaster SEPAR members are asked to go to the repeater 147.360+ T110.9 (or via the south repeater using T103.5) to check in. If the repeater fails to respond, go to the simplex frequency of 146.550.

This year Scott VE7KAT volunteered to "start and run the net". Scott is an experienced ham but not one of our regular NCO's. He was simply given a copy of the script (available on our website) and some instructions on being prepared to take notes on information given by stations checking in. This is the realistic expectation of the first person on the frequency after an event. The net control continues until they are relieved and have passed

any relevant information to the NCO assuming the net. As we develop tools and aids these will be posted to the SEPAR page on the website to make them available to everyone.

Those checking in were asked to provide to the net:

1. Your general location (Nearby cross street or hundred block)



2. Do you have any injuries or emergencies to report?
3. Do you have power, phone, internet connection?
4. What type of radio capabilities do you have right now. How long will your power last? Any damage to your home/business?
5. If you are mobile, please report your direction of travel and any problems or issues you have seen on the road as a result of the earthquake.

If capable, participants were also asked to send a “*Did You Feel It*” Winlink Report into the USGS, SEPAR, the Provincial Regional Emergency Operation Center, to our neighbors south of the border in Whatcom County EOC, and the WINLINK ETO training group.

- We had a successful net with 26 voice check ins from within the city, surrounding municipalities as well as from our US neighbors in Whatcom County.
- There were 12 Winlink check ins with 6 of them from the US side.

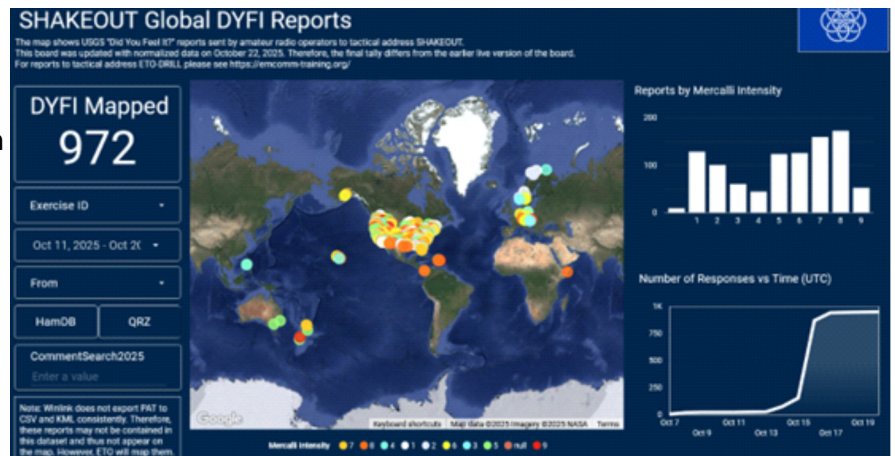
Evaluation

- Positive experience from participating radio operators.
- Net control did a good job.
- Net control built a form to aid with gathering data from participants during their check-ins.
- Most individuals checking in are not experienced in providing a concise report.
- Gathering the name of the person checking in can waste valuable time. (Most amateurs know each other)
- A brief report is all that is initially needed and some will provide to much information.
- Understanding what is important to provide is important. Injuries, significant damage in some areas with little damage in other areas can help responders know where to attend first.

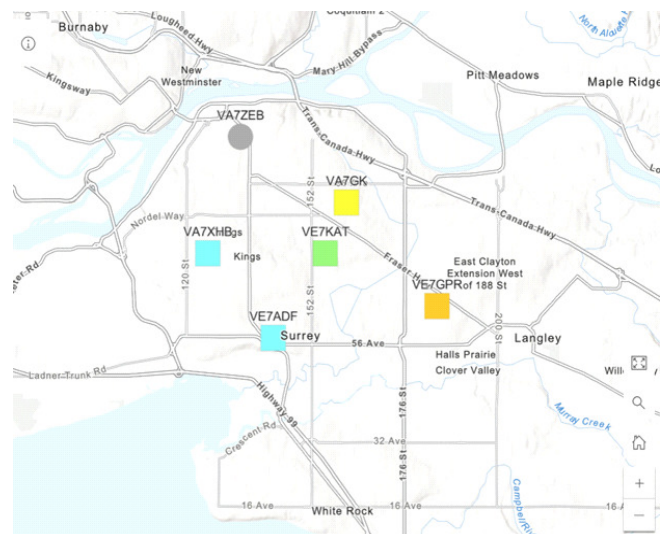
The local region reports sent in via Winlink:
(Color of check-in indicated shaking intensity reported. This can be used to create a visual report of areas with probable damage based on shaking intensity).

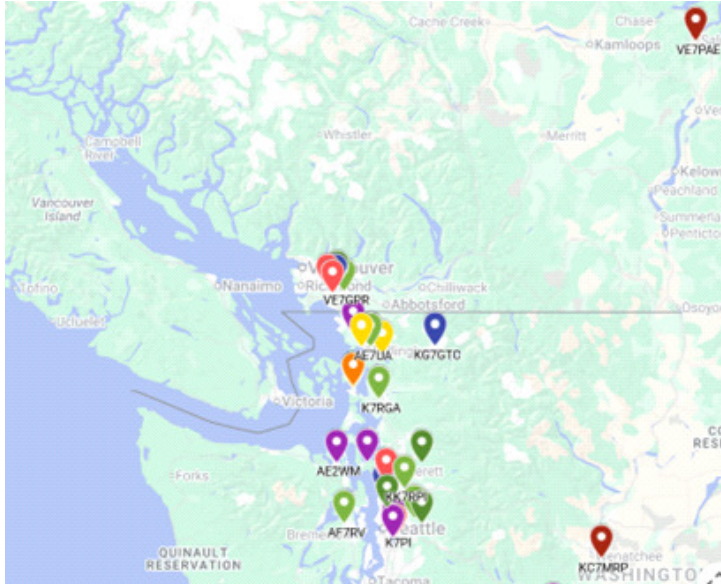


North America Intensity Shakeout Map
 created from reports sent to the USGS



A screenshot of the Shakeout Reports: North America Intensity
 Shakeout Map created from reports sent to the USGS





Of Interest only one other amateur in British Columbia participated via Winlink. VE7PAC (top right) near Salmon Arm BC also checked in.

- Greater training and use of the Winlink system would increase use.

Feedback from Whatcom EOC

- Established contact with Surrey, BC
- Good comms with Surrey SEPAR on both the Sumas VHF (145.230) and Surrey VHF (147.360) repeaters.

Outcome/Actions

New SEPAR Net Protocol has been created. This has resulted in an updated net script and includes a checklist to encourage participants to provide specific information to help improve reporting. The net script was also changed to help eliminate unnecessary information being repeated. For example, we will no longer ask if people will participate in the Simplex or Secondary net. The NCO will simply announce the net is changing frequencies and do a quick call down the list for everyone, no reply and they will move on quickly. Changes to net script and check-in protocol development have been published on the website (<https://www.ve7sar.net/separ/separ-net-protocol>).

We have created a list of important information to gather, a color system to help speed things up and some examples of how to use the script.

Protocol Information reported and Color Explanation:

- **Callsign & Location:** Self-explanatory.
- **Radio:** Is your station fully operational, sufficiently charged (if portable), and ready for use? Green means your station is fully operational and ready for use. Yellow means it is operational but not perfectly functional. Red means that while you are able to check in, your station is not expected to remain operational. A few words after Yellow or Red to briefly explain are welcome.
- **Internet:** Do you have access to the Internet (either through your cell phone or your wired Internet)? Green means you have full access to the Internet, either through your phone or via wired Internet. Yellow means you have access to the Internet, but it is compromised. Red means you do not have access to the Internet. A few words after Yellow or Red to briefly explain are welcome.
- **Grid Power:** Is the power grid operational in your area? Green means grid power is fully functional. Yellow means power is available but it is intermittent or compromised. Red means grid power is out. A few words after Yellow or Red to briefly explain are welcome.
- **Roads:** Are road conditions normal? Normal includes routine traffic. Green means roads are normal for that time and place. Yellow means something unusual is happening, either an obstruction or higher-than-usual traffic. Red means something severely unusual is happening. A few words after Yellow or Red to briefly explain are welcome.
- **Mobility and Availability:** Do you have mobility and are you available for SEPAR assignments? I am mobile/not-mobile by car/foot/bicycle/transit/other and am available/not-available for assignment. Explanations are entirely unnecessary here. If you are unavailable but anticipate being available later, please state this briefly.
- **Any further traffic:** Important issues only. Focus on conveying information as efficiently as possible, with as few words as possible.



The website provides definitions to help people understand the color system and why we are making this change. The SEPAR net is not a conversational net but a practice net for the emergency program. We encourage check ins and participation. To allow all hams and visitors to feel welcome the SEPAR Net Protocol is optional.

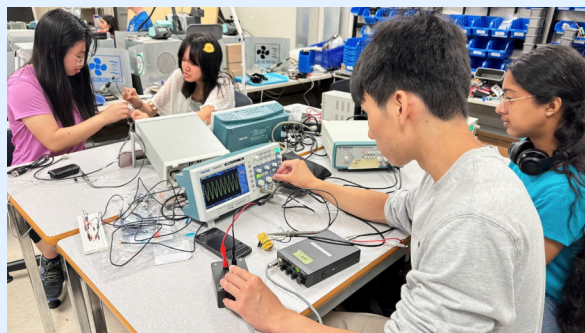
We will continue to evaluate and improve our program and will welcome feedback and comments.

As always if you have any questions or want further information on the SEPAR program please reach out.

~ Gord Kirk VA7GK
Volunteer SEPAR Coordinator

coordinator@separ.ca

We're back on track!



Following a very successful [2024 Summer School RF Communications course](#), Adam Drake VE7ZAL made application to have the course accepted as part of their regular school semester. At the October 8 public board meeting, the Surrey Board of Education approved the additions of Financial Literacy 12 and Radio Frequency Communications 11 for the 2026-27 school year.

RF Communications will be offered at Kwantlen Park Senior Secondary School in Surrey, BC. The course offers an introduction to, and a practical understanding of, modern radio frequency communications, encompassing Wi-Fi, Bluetooth, cellular and radio technologies. Students will explore the theory and practice around these methods of voice and data transmission, alongside the legal requirements to operate such equipment.

They will consider practical use cases, including satellite communication, long range voice and data transmission, infrastructure design and emergency services communication.

At the end of the course, students will be provided with an opportunity to write the Basic and Advanced Amateur Radio Certification exam. During last year's summer school course, 18 students successfully obtained certificates, with several attaining Advanced certification.

Adam will be supported by Surrey Amateur Radio Communications and its course instructor John Schouten VE7TI.

https://www.surreyschools.ca/_ci/p/174647

~



Is Amateur Radio an Old Hobby or a playground for explorers?

by JOHN SCHOUTEN VE7TI

Amateur radio has sparked ongoing debates about its relevance—whether it stands as a vestige of the past or serves as an ever-evolving space for today’s explorers. While some imagine the hobby as an old-fashioned pursuit, involving vintage equipment and Morse code, others see it as a dynamic realm where enthusiasts can innovate and connect across the globe. In reality, amateur radio weaves together history, challenge, and community, offering a blend of time-honoured tradition and modern exploration. By looking at its roots, current uses, and the many ways people engage with it, the multifaceted nature of amateur radio becomes clear: it is alive with opportunity for discovery and innovation across generations.

The notion of amateur radio as an antiquated hobby is grounded in its early origins. It began in the early twentieth century, with figures like Guglielmo Marconi laying the foundation for wireless communication. By the 1920s, hobbyists were building their own radios, reaching out across continents with technology that now seems antiquated—vacuum tubes, large transmitters, and Morse code. These images have shaped the idea of the “old” amateur operator:

someone dedicated to preserving the practices of a bygone era. The licensing process—studying radio theory and protocols—can appear old-fashioned amid the era of instant digital communication. Critics may argue that, in a world saturated by advanced networks and effortless global messaging, amateur radio's significance is fading. However, this perspective misses the living tradition and adaptability that continues to attract new practitioners.

A Playground for Explorers

Despite perceptions, amateur radio remains a space for creative experimentation and adventure. The development of software-defined radio (SDR) is one example of the hobby’s progress—operators use computers to process radio signals, experimenting with new forms of communication such as digital voice modes and data transmission like FT8. These technologies enable global connections with minimal equipment, illustrating how old and new techniques blend. The hobby’s hands-on spirit is alive in the construction of antennas, electronics tinkering, and even launching personal satellites.



In his column “Foundations of Amateur Radio”, our hobby was aptly described recently by Onno Benschop VK6FLAB, as “1000 hobbies in one,” highlighting its incredible diversity and reminding newcomers that there is a place for everyone, regardless of experience or background, encouraging newcomers not to be dissuaded by “gatekeepers.” ([The Communicator: Sep-Oct 2024, p. 93-94](#))

Emergency Communication

Amateur radio plays a vital role in emergencies, providing communication when modern infrastructure fails. After disasters that disable cell towers and internet access, amateur operators step in, relaying critical information. This capacity for direct, network-independent contact has proven invaluable during real-world crises. Training and public service are core parts of the hobby, drawing in new generations eager to serve their communities.

Global Community

The worldwide network of amateur radio operators is another avenue for exploration. With millions of licensed hams, the hobby fosters contacts that transcend borders and languages. Through contests and informal exchanges, participants form a global web of connections, making each contact a small adventure. Events like international contests and youth programs provide opportunities for learning, competition, and friendship.

Technical Challenge and Personal Growth

Although some find the technical learning curve daunting, it is this very challenge that energizes amateur radio’s explorer spirit. Mastery of radio theory, Morse code, and DIY engineering inspires curiosity and persistence, aligning with STEM

education and the maker movement. Youth programs and scouting events introduce the next generation to building and using radios, ensuring the tradition and spirit of discovery continue.

Space and Technology Integration

Amateur radio’s engagement with space exploration sets it apart from more conventional communication methods. Programs like ARISS allow students and hobbyists to connect with astronauts on the International Space Station. The construction and operation of CubeSats—small, amateur-built satellites—showcase the hobby’s reach beyond terrestrial bounds.

Integration with internet technology, as seen in platforms like Echolink, demonstrates amateur radio’s ability to adapt without losing its roots.

Amateur radio is at once a nod to history and a vibrant arena for explorers. It offers experiences that commercial technologies cannot replicate, such as operating without infrastructure, exploring unique frequency bands, and engaging in global and even space-based communication.

Examples from emergency support to youth and satellite projects underscore its vitality. For those who value curiosity, hands-on challenge, and genuine connection, amateur radio remains a timeless space for innovation and adventure.

~ John VE7TI



HAM LEFTOVERS...

The 5th Edition of SWR magazine is here!

The Caribbean Amateur Radio Association has published the 5th edition of their attractive amateur radio magazine "SWR". It is available as a flip-book (magazine style) or as a download.

English: <https://online.fliphtml5.com/kqkyd/epue/> Español: <https://online.fliphtml5.com/kqkyd/kvgw/>

A Ham-adjacent portable repeater

Although ham radio offers a wide array of bands to transmit on, not to mention plenty of modes to communicate with, not everyone wants or needs to use all of this capability. For those needing simple two-way communication services like FRS or GMRS are available (in North America) with much less stringent licensing requirements, and GMRS even allows repeaters to be used to extend their range beyond the typical mile or so - but only in the U.S. - NOT in Canada. Dave aka N8DAV has built an off-grid simplex repeater that can travel around with him wherever he goes. <https://hackaday.com/2025/09/26/a-ham-adjacent-portable-radio-repeater/>

Convert a Raspberry Pi into a global amateur radio transmitter

What if you could broadcast signals across the globe using just a credit-card-sized computer and a handful of components? It might sound like a scene from a sci-fi novel, but with a Raspberry Pi and some clever engineering, you can transform this humble device into a fully functional ham radio transmitter. <https://www.geeky-gadgets.com/raspberry-pi-ham-radio-project/>

Hot Iron: A free quarterly focussing on construction projects

Our wonderful hobby includes those with a great deal of electronic knowledge as well as those just beginning their journey. Some prefer digital modes and projects, others prefer analog projects and devices that glow in the dark. This quarterly newsletter, begun by G3PCJ of Walford Electronics, tries to publish something for each, while trying to keep the focus on construction of various devices! <https://w4nnp.org/>

Student-designed technology bound for the space station

What does it take to get a small student-built satellite to the International Space Station so it can be tested in orbit? Eight years, more than 120 undergraduates, industry collaborators, and a lot of glue. Later this fall, Alpha CubeSat is scheduled to be rocketed to the ISS. Amateur Radio is being asked to assist with data capture. Read more [Here](#) and watch a video [Here](#) with an opportunity send your message.



Thank you recent visitors... 166 countries and counting—more than in my log!

	33,628		248		72		20		8		3		2		1
	21,857		217		72		17		7		3		2		1
	13,529		208		70		15		6		3		2		1
	3,738		190		70		14		6		3		2		1
	2,341		189		64		13		6		3		2		1
	2,005		188		48		13		6		3		2		1
	931		188		48		12		5		3		2		1
	903		181		46		12		5		3		2		1
	739		180		45		12		5		3		2		1
	733		176		43		11		5		3		2		1
	705		176		39		11		4		3		1		1
	587		174		34		11		4		2		1		1
	544		141		33		11		4		2		1		1
	452		115		31		11		4		2		1		1
	439		114		30		10		4		2		1		1
	375		106		30		10		4		2		1		1
	370		100		28		10		4		2		1		1
	351		93		28		10		4		2		1		1
	327		88		27		9		4		2		1		1
	307		82		20		9		4		2		1		1
	306		81		20		8		4		2		1		1



*No problem, we'll have you
back on the air in no time*

*Courtesy Breakout: Newsletter of the
Hastings and Napier Amateur Radio
Club - - January 2025*

Reprint Policies

This is a bi-monthly journal about amateur radio, and other relevant topics, published by Surrey Amateur Radio Communications (SARC). Reprints are often requested, and these are our policies for re-publication of articles from The Communicator,

This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/). All rights are reserved.

You may use articles authored by SARC members for your club newsletter or other amateur radio publication, provided that the purpose is non-commercial, you credit the author, and provide a link as follows: <https://ve7sar.blogspot.com/search/label/SARC%20Communicator>. If our article indicates it is from a source outside of SARC, we cannot transfer that right, and you must seek permission to re-publish from the original source. We appreciate being notified via email to communicator@ve7sar.net if one of our original articles has been re-printed elsewhere.

We welcome your comments and feedback

Please consider leaving a comment via email to communicator@ve7sar.net, or on our blog site <https://ve7sar.blogspot.ca> or, better yet, contact our authors directly, so they know someone is out there reading their work in our publication.

SARC SOCIETY DIRECTORS

2024-2025

PRESIDENT

Steve Mclean VE7SXM
[president at ve7sar.net](mailto:president@ve7sar.net)

VICE PRESIDENT

John Brodie VA7XB
[vicepresident at ve7sar.net](mailto:vicepresident@ve7sar.net)

SECRETARY

Mike Porisky VE7YEG
(Contest Manager)
[secretary at ve7sar.net](mailto:secretary@ve7sar.net)

TREASURER

Scott Hawrelak VE7HA
[treasurer at ve7sar.net](mailto:treasurer@ve7sar.net)

DIRECTORS

Andrew Elgin VA7LGN
[andrew.elgin at gmail.com](mailto:andrew.elgin@gmail.com)

Gord Kirk VA7GK
(SEPAR Liaison)
[SEPAR at ve7sar.net](mailto:SEPAR@ve7sar.net)

John Schouten VE7TI
(SARC Communicator/Blog)
[communicator at ve7sar.net](mailto:communicator@ve7sar.net)
[course at ve7sar.net](mailto:course@ve7sar.net)

Stan Williams VA7NF
[flowbased at shaw.ca](mailto:flowbased@shaw.ca)

John Brodie VA7XB
(SARC Membership & QSL
Manager)
[membership at ve7sar.net](mailto:membership@ve7sar.net)

SARC REPEATER MANAGER

Horace Bong VA7XHB
[repeater at ve7sar.net](mailto:repeater@ve7sar.net)

SARC NET MANAGER

Reg Natarajan VA7ZEB
[net at ve7sar.net](mailto:net@ve7sar.net)

A look back...

at The Communicator—December 2015



Read about it at:

https://archive.org/details/SARC_Communicator_2015-12/mode/2up

Past Communicators are available at:

[Past Communicator Issues](#)

or search the complete Communicator contents & index at:

[SARCindex](#)



November & December

As we slide into the short days and long nights of the next few months we hope that you will be able to spend some quality time with family, friends and neighbours.

From all of us at SARC and SEPAR we wish you the very best for a safe and happy holiday season.



On the Web ve7sar.net

Between Communicators, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

Click the links below to follow our presence on the web and social media:

SARC Blog
ve7sar.blogspot.ca

Bluesky (No more 'X')
[#ve7sar.bsky.social](https://www.bsky.app/profile/ve7sar.bsky.social)

FaceBook
[SurreyAmateurRadio](https://www.facebook.com/SurreyAmateurRadio)

Our YouTube Channel
[SurreyARC](https://www.youtube.com/SurreyARC)

SARC hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228. On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

Every Thursday evening at 8 pm is SARC's net for newly certified hams, although more experienced hams are also encouraged to attend. This net operates on the same frequencies shown above for the Tuesday nets. Participants will help you with your new-ham questions and assist you in getting comfortable using your radio. Check in with your GOTA net hosts.

Join the 220 MHz net taking place at 7:30 pm on the last Sunday of every month on VE7RSC repeater 223.960 MHz -1.6MHz tone 110.9 Hz, with net control, Shawn VE7BD. This is not a "chat" net – just check in, exchange signal reports, and get on with your evening.

Down The Log...

SARC Monthly Meetings

2nd Wed. (Sept-Jun)
1900 hrs at the [Surrey Fire Service Training Centre](https://www.surreyfire.ca/), 14923 - 64 Avenue, Surrey, BC. Here is a what3words link and map: <https://what3words.com/markers.addiction.ozone>

Weekly SARC Social

Saturday between 0730 and 0930 hrs at the Denny's Restaurant, 6850 King George Blvd., Surrey BC

Workshops

Saturday between 1000 and Noon at the OTC 5756 142 Street, Surrey

SEPAR Net

Tuesday at 1930 hrs local on 147.360 MHz (+) Tone=110.9

SARC Net

Tuesday at 2000 hrs local on 147.360 MHz (+) Tone=110.9

VE7RSC Repeaters

2m North: 147.360MHz+ Tone=110.9Hz
IRLP node 1736
Echolink node 496228

2m South: 147.360MHz+ Tone=103.5Hz Fusion capable; No IRLP/ EchoLink

1.2m: 223.960 Mhz -1.6 Tone=110.9Hz

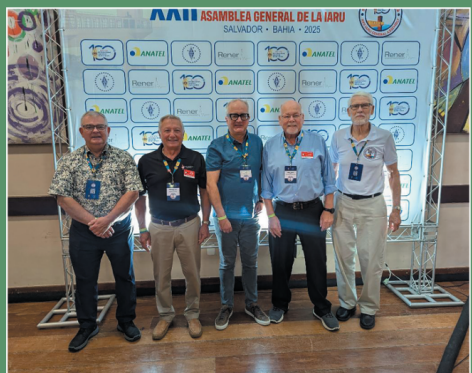
70cm: 443.775MHz+ Tone= 110.9Hz
IRLP node 1737
WiRES-X Room ID 00047

THE CANADIAN AMATEUR

NOVEMBER / DECEMBER – NOVEMBRE / DÉCEMBRE 2025



The Importance of Showing Up! Everywhere!



The Canadian Amateur (TCA),

Canada's premiere national magazine devoted to Amateur Radio, is published six times per year and is the membership journal of the Radio Amateurs of Canada (RAC). It is available in both print and digital versions (eTCA). Members of RAC, Canada's sole national Amateur Radio organization, receive TCA automatically.

A subscription to TCA also provides membership in Radio Amateurs of Canada. RAC is also the publisher of TCA. For information on how to join Radio Amateurs of Canada and subscribe to TCA please visit our [Membership Sign Up page](#).

At 64-pages per issue and reaching approximately 4,500 readers, TCA offers news and views on the Canadian Amateur Radio scene from coast to coast. It includes regular columns, features and technical articles of interest to Amateur Radio operators. In addition, a Coming Events calendar, Feedback, QSL Bureau information and coverage of regulatory issues are also provided.

If you would like additional information about The Canadian Amateur magazine please contact the Editor Alan Griffin at tcamag@yahoo.ca.



ICOM

IC-7300MK2

NEW

HF Excellence, Evolved — Even More Excitement

